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VOLUME XI FEBRUARY, 1920 NUMBER 2

THE JOURNAL OF
EDUCATIONAL PSYCHOLOGY

The Administration of the Psychology Prerequisite to Courses in Education

CLIFFORD WOODY

University of Washington

I. INTRODUCTION

TO an instructor in a college or university, or to one charged with the administration of courses in such institutions, in all probability no problem is of more vital concern than that of prerequisites. The instructor has a two-fold interest in that he wishes on the one hand to safeguard his courses from those students who are too ill-prepared and too inexperienced to profit by them and on the other hand he does not desire his courses to be hedged about with such a relay of prerequisites that they are closed to the vast majority of students who might otherwise be eligible to enter them. The administrator, such as a head of a department, dean of a college or director of a school, no doubt has the same interests as the instructor directly in charge of the courses, but he has the additional interest of wishing to develop his department or college or school in what he considers the most efficient and meritorious manner of accomplishing the ends for which his particular unit exists. He does not wish the development of his unit to be hampered by prerequisites, no matter how desirable they may seem to be, if they interfere with the administration of the courses under his charge. As a rule he, like the instructor, is not opposed to prerequisites as such, for they must exist both within a department and among departments, but he is opposed to those for which he is evidently in no way responsible and which cannot be administered with justice to all—administrator, instructor and student. The interest in this problem of prerequisites is not limited to any single instructor, nor to the administrator of any single department or

college or school within any single college or university, but is manifest in all institutions of higher learning.

The present study is an attempt to determine the current practices within the leading state universities and colleges in this country concerning psychology as a prerequisite to courses in education. During the latter part of May, 1918, questionnaires were sent to those directing the courses in education in most all State universities and colleges as listed in United States Bureau of Education Bulletin No. 6, 1916 (Statistics of State Universities and State Colleges). Similar questionnaires were sent to Leland Stanford, Syracuse, Chicago and Columbia. From the 88 questionnaires sent out 44 usable replies were received. Several other institutions replied but stated that no such courses were offered or that the institutions concerned were not typical.

In tabulating the data, these institutions were divided into five distinct groups. Group I, consisting of 12 large State universities, each having over 2,000 students enrolled, as shown by the United States Bureau of Education Bulletin No. 6, and not classified as mainly technical or agricultural, includes such universities as California, Ohio, Illinois, Wisconsin, Minnesota, Iowa, Michigan, Indiana, Washington, etc. Group II, consisting of 16 similar institutions, but having less than 2,000 students each, includes such universities as Montana, Oklahoma, Colorado, Maine, Idaho, North Dakota, Tennessee, South Carolina, etc. Group III, consisting of 11 State technical or agricultural institutions, includes Iowa State College, Kansas State College, Michigan Agricultural College, Purdue University, Oregon State College of Agriculture, Agricultural and Mechanical College of Texas, etc. Group IV consists of the State Teachers Colleges of Colorado and New York. Group V consists of three private institutions, Leland Stanford, Syracuse University, and Teachers College, Columbia University.

The results as gathered from these data will be presented under the following heads:

1. Administrative Control of Courses in Psychlogy and Education.

2. Psychology as a Prerequisite to Courses in Education.

3. Current Practices in the Administration of the Psychology Prerequisite.

4. Nature of the Psychology Satisfying the Requirement.

II. Results

A. Administration Control of Courses in Psychology and Education

1. *Departmental Control*

If one is to understand thoroughly the relation of courses in psychology to those in education he must understand the departmental control of such courses. In Table I almost the whole history of the development of departmental control of courses in education is made manifest. It shows that at the present time in

TABLE I
DEPARTMENTAL CONTROL OF COURSES IN PSYCHOLOGY AND EDUCATION

	GROUPS					
	I	II	III	IV	V	Total
Number of institutions.	12	16	11	2	3	44
Total number reporting.	11	16	9	2	3	41
In independent departments.	9	6	2	1	2	20
In department of psychology,			1			1
In department of philosophy,	2	5*	1			8
In combined department of psychology and education,		5	5	1	1	12

*Note: The Universities of Colorado and North Dakota are included under the jurisdiction of the department of philosophy. However, it should be stated that such jurisdiction was indicated as not confined exclusively to this department.

20 of the 41 institutions the courses in education and psychology are given in independent departments. This tendency is most pronounced in the institutions in Group I (the larger State universities), but it is quite distinct in Group II (the smaller State universities). In Group III (the technical and agricultural institutions) and to a considerable degree in Group II the jurisdiction of the courses rests in a department designated as the department of psychology and education. Since this tendency is most marked in the smaller and the technical or agricultural institutions, one can rest fairly well assured that it is due to small offering of courses in these subjects. It is interesting that 8 institutions have the courses in psychology and education under the jurisdiction of the philosophy department. This is a remnant of an earlier period in university development when philosophy held full sway and when psychology as well as education was considered unworthy of much respect. It is rather surprising to see that only a single institution reports courses in education under the jurisdiction of the department of psychology.

One would rather expect to find such jurisdiction in the smaller colleges and universities where psychology was earlier established and where institutional growth has been hampered, but apparently this is not the case. One must conclude from these facts that as a rule courses in education tend to be controlled by an independent department, which is on a par with other departments and tends to develop unhindered along lines of its own desires.

2. *Faculty Control*

The independence of the departments of education is magnified when one notes that the department itself usually determines what the prerequisites to its courses shall be. Table II shows that the Department of Education in 29 out of the 44 institutions reporting, determines its own prerequisites. In 3 institutions of Group I and 7 institutions of Group II the general faculty exercise the prerogative of determining the prerequisites. However, it probably happens in these cases, as was indicated by one of the smaller State

TABLE II

AGENCIES DETERMINING PREREQUISITES TO COURSES IN EDUCATION

	GROUPS					
	I	II	III	IV	V	Total
Number of institutions,	12	16	11	2	3	44
Department of education,	9*	6	10§	2	2	29
Departments of education and psychology,	0	2†	1	0	1	4
Faculty of college or university,	3	7‡	0	0	0	10
Instructor giving course,	0	1	0	0	0	1

Notes:
*One replied, "instructor, department and dean have complete control."
†One replied, "departments of education and psychology with consent of instructor."
‡One replied, "on recommendation of the department of education."
§One replied, "department of education, but must be passed upon by faculty."

institutions, that the general faculty merely passes upon the recommendations of the department of education. It is quite interesting to note in passing that only 1 institution reports that the instructor giving the course has the power to determine the prerequisites and but 2 others mention the fact that the instructor is consulted. Such a condition, so far as this investigation is concerned, merely emphasizes the fact that the prerequisites for courses in education are determined by the department itself and not by the caprice of the individual instructor or of the general faculty.

B. Psychology as a Prerequisite to Courses in Education

In many educational institutions the department of education is serving two distinct classes of students, those who are working for teacher's certificate or diploma, and those who are working for the undergraduate degree in education. Often times the administration of prerequisites is different in case of these two classes of students, and the facts concerning them are presented in separate sections.

1. *Psychology as a Prerequisite to the Teacher's Certificate*

From Table III it is firmly established that in current practice psychology is considered an essential part of the teacher's training

TABLE III

PSYCHOLOGY AS A PREREQUISITE TO THE TEACHER'S DIPLOMA

	GROUPS					
	I	II	III	IV	V	Total
Number of institutions,	12	16	11	2	3	44
Psychology as a prerequisite,	10	15	10	2	2	39
Psychology not a prerequisite;	2	1	1		1	5

for it is made a prerequisite to the teacher's diploma in 39 of the 44 institutions reporting. However, it is interesting to relate that three of the larger institutions in this country (Universities of Indiana and Texas in Group I and Leland Stanford University in Group V) do not make it a prerequisite. Yet it should be added that both the University of Indiana and University of Texas recommend and urge all prospective teachers to take courses in psychology.

The importance of psychology as an essential part of a teacher's training is emphasized by the fact that 35 of the 42 institutions reporting on this question say that psychology is considered a part of the regular professional training, but it must be added that this pronounced tendency is due to the preponderance of the smaller institutions. Of the 15 larger institutions of Groups I and V, 6 say that psychology is not considered a part of the professional training and if taken shall be taken in addition to the professional work. Such facts undoubtedly should not be interpreted as minimizing the value of psychology, but rather as magnifying and emphasizing the need of professional training.

While the practice of requiring psychology as a prerequisite to the granting of the teacher's diploma is well established, it would be erroneous to conclude that psychology is a prerequisite to all courses in education. Table IV shows 20 of the 44 institutions plainly state that it *is not a prerequisite to all courses in education.*

TABLE IV
PSYCHOLOGY AS A PREREQUISITE TO COURSES IN EDUCATION

	GROUPS					
	I	II	III	IV	V	Total
Number of institutions, ...	12	16	11	2	3	44
Prerequisite to all courses, ...	6	11	4	2	1	24
Not prerequisite to all courses, ...	6	5	7		2	20
Prerequisite to particular courses, ...	5	4	4		2	15
Not prerequisite to any course, ...	1	1				2

Note: Lower part of table refers to 20 institutions not making psychology prerequisite to all courses.

Of these 20 institutions, 15 report that it is a prerequisite to particular courses only, 2 that it is not required at all, while 3 did not indicate detailed practice. Of the 15 largest and best-developed institutions of Groups I and V, 8 do not make it prerequisite to all courses. This is probably due to the fact that in the larger universities more varied and differentiated courses in education are offered and close connection between some of the courses and psychology is not manifest. This conclusion is strengthened when one recalls that the prerequisites to courses in education are as a rule determined by those in charge of the departments of education, who, no doubt, have made such determinations only after a thorough analysis of the different courses and their bearing upon other related courses.

It is not surprising to find that 11 of the 16 smaller State universities require psychology as a prerequisite to all courses in education. but it is rather striking that 7 of the 11 agricultural and technical institutions do not make such a requirement. It may be that the latter institutions, often having scant offerings in both psychology and education and having a large number of students to be accommodated, make no such requirement because it is impossible to administer a rigid system of prerequisites, or it may be that in some of these large institutions, as in the large institutions of Groups I and V, some of the courses in education tend to have no direct relation to psychology. While it seems that there is no

pronounced tendency towards requiring psychology as a prerequisite to all courses in education, it should be pointed out that there is universal agreement as to its value. Such an agreement is evidenced by the fact that 14 of the 17 institutions requiring psychology as a prerequisite *to particular courses only* strongly urge all students to take it.

The amount of psychology required for meeting the prerequisite as shown in Table V, varies from 2 to 10 semester hours (hour meaning 1 recitation daily for 18 weeks) but the usual amount is from 3 to 6 hours. Such practices probably mean that the course in psychology is given 3 days per week and is required for either 1 or 2 semesters.

The table reveals nothing striking, unless it is the slight tendency for the larger institutions to require a smaller number of hours, a tendency which might easily be explained by the intensive and highly-specialized courses given in the departments of education in such institutions.

2. *Psychology as a Prerequisite to an Undergraduate Degree in Education*[1]

A few decades ago courses in education were unknown and nothing gives evidence of their growth so much as a consideration of the number of institutions which are now offering degrees in that subject. One is surprised to note in Table IV that 34 of the 44 institutions grant undergraduate degrees in education. It is especially surprising to find this practice in the agricultural and technical institutions, where 9 of the 11 such institutions report the

[1]Note: The question was asked concerning the amount of psychology in addition to the prerequisite required for an advanced degree in education. As we should expect, many of the institutions do not give such degrees, and among those which do there is no uniformity of practice. No correlation exists between the amount of the original prerequisite and the amount of additional hours required. There is a manifest tendency among the larger institutions to base the amount required upon the selection of the minor. The tabulated results of the 23 institutions reporting such degrees are as follows:

Number of Aditional Hours	Institutions Reporting
0	3
2-3	5
4-5	1
6-7	5
8 or over	2
depending on minor	5

TABLE V

SEMESTER HOURS OF PSYCHOLOGY REQUIRED FOR PREREQUISITE

	GROUPS					
	I	II	III	IV	V	Total
Number of hours—0,	2	1	1		1	5
" " " 2,	2					2
" " " 3,	3	5	3		2	13
" " " 4,		2	2			4
" " " 5,	1	1				2
" " " 6,	4	6	3			13
" " " 7,						
" " " 8,		1	1			2
" " " 10,			1			1
Institutions reporting,	12	16	11		2	42*

*Note: Reports from the 2 institutions in Class IV were not usable for this item.

TABLE VI

PSYCHOLOGY AS A PREREQUISITE TO AN UNDERGRADUATE DEGREE IN EDUCATION

	GROUPS					
	I	II	III	IV	V	Total
Number of institutions,	12	16	11	2	3	44
Number granting degrees,	8	13	9	2	2	34
Number with prerequisite,	6	13	8	2	2	31
Number without prerequisite,	2					2*

*Note: One institution granting a degree failed to make reply concerning the prerequisite.

granting of degrees in education. It is likewise worthy of mention that 4 institutions in Group I, (California, Cornell, Michigan and Wisconsin) offer no undergraduate degrees in education.

Of the 34 institutions granting degrees in education, 31 require psychology as a prerequisite. The amount required as a prerequisite for a degree is usually the same as is required for the teacher's diploma. In an instance or two psychology is not required for the diploma and is required for the degree. Leland Stanford is a good illustration, requiring no psychology for the teacher's diploma, but 10 hours for the degree in education. In 23 of the 34 universities giving undergraduate degrees in education no more psychology than the original prerequisite is required. In the remaining 12 universities requiring more psychology, the additional amount required varies from 3 to 10 hours, but is usually either 3 or 6 hours. All this means that most of the work given for the degree in education is given within the education department itself. Table VII showing the number of hours of psychology required for securing the degree makes this point doubly clear. It shows

TABLE VII
DISTRIBUTION OF INSTITUTIONS SHOWING THE NUMBER OF SEMESTER HOURS IN PSYCHOLOGY REQUIRED FOR A DEGREE IN EDUCATION

	GROUPS					
	I	II	III	IV	V	Total
Semester Hours — 0,	2					2
" " 2,	1					1
" " 3,	1	1	3		1	6
" " 4,		1				1
" " 5,	1		1			2
" " 6,	2	4	2			8
" " 7,		1	1			2
" " 8,		3		1		4
" " 9,		2				2
" " 10,			1		1	2
" " 11,			1			1
" " 12,	1					1
Total,	8	13	9	1*	2	32

*Note: One institution in Class IV reported in an unusable form

that 20 of the 32 institutions reporting do not require more than 6 hours of psychology for the degree. Some of the outstanding exceptions to this tendency are the University of Minnesota (Group I) requiring 12 hours, University of Colorado (Group II) requiring 11 hours, Leland Stanford University (Group V) requiring 10 hours. However, requiring so much psychology for the degree in education is not the rule. It should be said in this connection that only 3 of the institutions offering degrees will allow the substitution of work in psychology for work in education. Of these 3 institutions, 2 will allow a substitution of only 3 hours, and 1 from 4 to 8 hours.

When asked if the time for taking the courses meeting the psychology requirement is the same in case of those working for the teacher's diploma and for those working for the degree, 25 institutions replied in the affirmative, 9 offer no degree, 5 said the practice is different and 5 failed to reply. Of these 5 institutions saying the practice is different 1 indicated that those working for the teacher's diploma meet the requirement in the freshman year, while those working for a degree in education meet it in the junior year. Another stated that in case of those working for a degree the requirements are more rigidly enforced. While it must be admitted that a few irregularities exist, from the facts in the last 2 sections, it must be concluded that the administration of the psychology requirement is about the same, regardless of whether one is working for the teacher's diploma or for a degree in education.

TABLE V

SEMESTER HOURS OF PSYCHOLOGY REQUIRED FOR PREREQUISITE

	GROUPS					
	I	II	III	IV	V	Total
Number of hours—0,	2	1	1		1	5
" " " 2,	2					2
" " " 3,	3	5	3		2	13
" " " 4,		2	2			4
" " " 5,	1	1				2
" " " 6,	4	6	3			13
" " " 7,						
" " " 8,		1	1			2
" " " 10,			1			1
Institutions reporting,	12	16	11		2	42*

*Note: Reports from the 2 institutions in Class IV were not usable for this item.

TABLE VI

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	GROUPS					
	I	II	III	IV	V	Total
Number of institutions,	12	16	11	2	3	44
Number granting degrees,	8	13	9	2	2	34
Number with prerequisite,	6	13	8	2	2	31
Number without prerequisite,	2					2*

*Note: One institution granting a degree failed to make reply concerning the prerequisite.

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TABLE VII
DISTRIBUTION OF INSTITUTIONS SHOWING THE NUMBER OF SEMESTER HOURS IN PSYCHOLOGY REQUIRED FOR A DEGREE IN EDUCATION

	GROUPS					
	I	II	III	IV	V	Total
Semester Hours — 0,	2					2
" " 2,	1					1
" " 3,	1	1	3		1	6
" " 4,		1				1
" " 5,	1		1			2
" " 6,	2	4	2			8
" " 7,		1	1			2
" " 8,		3		1		4
" " 9,		2				2
" " 10,			1		1	2
" " 11,			1			1
" " 12,	1					1
Total,	8	13	9	1*	2	32

*Note: One institution in Class IV reported in an unusable form

that 20 of the 32 institutions reporting do not require more than 6 hours of psychology for the degree. Some of the outstanding exceptions to this tendency are the University of Minnesota (Group I) requiring 12 hours, University of Colorado (Group II) requiring 11 hours, Leland Stanford University (Group V) requiring 10 hours. However, requiring so much psychology for the degree in education is not the rule. It should be said in this connection that only 3 of the institutions offering degrees will allow the substitution of work in psychology for work in education. Of these 3 institutions, 2 will allow a substitution of only 3 hours, and 1 from 4 to 8 hours.

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C. Current Practices in the Administration of the Prerequisite of Psychology

According to a current slogan there is a great difference between theory and practice. It is reasonably clear that the psychology prerequisite is accepted in theory but that it is not lived up to in practice. The cause of the failure to enforce the prerequisite may lie in its application to special cases, but the fact remains that it is *flexibly and not rigidly administered.* There is much evidence to substantiate this assertion.

1. *Possible Sequences of Courses*

The first evidence of conflict between theory and practice is manifest in Table VIII. The upper part of this table is carried

TABLE VIII
CURRENT PRACTICES IN ADMINISTERING THE PSYCHOLOGY PREREQUISITE TO COURSES IN EDUCATION

	GROUPS					
	I	II	III	IV	V	Total
Number of institutions,	12	16	11	2	3	44
Stating psychology prerequisite to all education,	6	11	4	2	1	24
Requiring completion of psychology before taking education,	3	2	1	1	2	9
Not requiring completion of psychology before taking education,	9	14	10	1	1	35
Permitting taking courses simultaneously,	9	14	10	1	1	35
Not satisfied with taking psychology at any time before graduation,	9	9	10	2	3	33

forward from Table IV where the returns were presented to the question, "Is psychology a prerequisite to all courses in education?" It shows that 24 institutions reported in the affirmative, yet the lower part of the table reveals that but 9 of the 24 institutions so reporting require that psychology be completed before courses in education are taken. This means that the 15 remaining institutions make exceptions in the administration of the prerequisite, even though in theory they are not supposed to do so. If one should combine with these 15 institutions, the 20 institutions which do not require psychology as a prerequisite to all courses in education, it seems that 35 of the 44 institutions would not require the completion of the psychology prerequisite before work in education is taken. All 35 of the institutions say that they are willing

that courses in psychology and education be taken simultaneously—a condition which might furnish some sanction for the practice.

Even though Table VIII shows a willingness to compromise in the administration of the psychology prerequisite, one feels that this tendency is caused in many instances by the exceptional cases and represents a variation from the regular practice. The nature of some of the questions asked e. g., "would it be possible for a student to take a required course in education and the course in psychology at the same time?" tends to center attention on the special rather than the ordinary case, but in no other way could the actual practice be ascertained. The results so obtained indicate that the cause of the compromise lies in the fact that a rigid system of prerequisites cannot be universally administered with justice to all concerned. Even though 35 institutions would allow a student to take courses in education without completing his work in psychology, 33 of them said it would *not be satisfactory* for the student to finish his psychology at *anytime before graduation.* This simply means that the institutions show some leniency in the administration of the prerequisite but they expect the work finished as soon as possible.

In connection with the time for finishing the psychology prerequisite it might be well to add that Table IX shows the most common practice is to begin courses in education in the junior year.

TABLE IX
COLLEGE YEAR COURSES IN EDUCATION ARE BEGUN

	GROUPS					
	I	II	III	IV	V	Total
Number of institutions,	12	16	11	2	3	44
Freshmen year,	3	5	3	1		12
Sophomore year,	2	5	2			9
Junior year,	7	5	6	1	3	22
Senior year,		1				1

The next most common practice is to begin them in the freshman year. At first thought it might seem that in those 24 institutions which make psychology a prerequisite to all education, the courses in education would not begin until the junior year, but this is not necessarily true. Of such institutions, 12 begin courses in education in the junior year, 7 in the freshman year, 4 in the sophomore year, and 1 in the senior year. So it seems that the prerequisite has little to do with the time of beginning courses in

education, but the fact that such courses are begun so early in some institutions, undoubtedly complicates the administration of the psychology prerequisite.

2. *Administration of the Prerequisite for Students in Other Departments not Working for Teacher's Certificate or Degree in Education.*

Additional evidence that the psychology prerequisite is not rigidly enforced is gleaned from the treatment of those from other departments who desire to elect certain courses in education, but who are not interested in the teacher's diploma or in the degree of education. These students have not met the psychology prerequisite and if they meet it, it is impossible at this time or later to elect the desired courses. Under such conditions what should those in charge of administering the prerequisite do? Table X shows how it would be administered in the institutions under consideration. While this table shows several facts we are especially interested in making comparison of the number of institutions stating that psychology is a prerequisite to all courses in education and the number who refuse admittance to the above mentioned students because they have not met the prerequisite. It is significant that 24 of the institutions make the blanket statement that psychology is a prerequisite to all courses in education, yet only 11 would not allow such students to elect the desired courses. These figures deal with admitting such students to courses in education in general, but even greater liberality is shown in dealing with certain specific courses. Only 9 institutions would refuse to admit a law student who had not met the psychology requirement into a course in educational sociology, and only 4 institutions would refuse to admit a major in history who had not met the psychology requirement into a course in the history of education, even though 24 institutions say such a requirement is a prerequisite to all courses in education.

D. Nature of the Psychology Satisfying the Prerequisite

Any attempt to summarize the nature of the courses in psychology which satisfactorily meet the prerequisite is apt to be misleading. In the original questionnaire four typical courses were listed and the different institutions were asked to add any others that might be needed and to check the ones which satisfied the

TABLE X

ADMINISTERING THE PSYCHOLOGY PREREQUISITE IN CASE OF STUDENTS IN OTHER DEPARTMENTS NOT WORKING FOR DIPLOMA OR DEGREE

	GROUPS					
	I	II	III	IV	V	Total
Number of institutions,	12	16	11	2	3	44
Number stating psychology as a prerequisite to all education,	6	11	4	2	1	24
Admitting such students without prerequisite,	8	11	6	0	1	26
Not admitting such students without prerequisite,	4	3	2	1	1	11
Not answering,	0	2	3	1	1	7
Admitting law student to educational sociology without prerequisite,	7	9	5	1	2	24
Not admitting law student to educational sociology without prerequisite,	3	3	2	0	1	9
Not answering or not giving course,	2	4	4	1	0	11
Admitting major in history to history of education without prerequisite,	7	15	8	1	1	32
Not admitting major in history to history of education without prerequisite,	3	0	0	0	1	4
Not answering or not giving course,	2	1	3	1	1	8

prerequisite. It happens that no additional courses were added, which fact might at first suggest a certain uniformity of practice. But such is far from the true situation as evidenced by the following list of courses or combination of courses satisfying the prerequisite: In 9 institutions, general psychology and educational psychology; in 2 institutions, general psychology or educational psychology; in 4 institutions, general psychology, and either modified course in general psychology, educational psychology or experimental psychology ;in 2 institutions, general psychology and experimental psychology; in 8 institutions, general psychology modified to meet the needs of education; in 5 institutions, educational psychology; in 2 institutions educational psychology or general psychology modified to meet the needs of education; in 2 institutions, a choice of either educational psychology or modified general psychology, etc. All told 14 different combinations exist for meeting the requirement.

Table XI is an attempt to summarize the total number of times each course was mentioned in connection with meeting the prerequisite. In the construction of this table, each time the course was mentioned it was recorded, no matter whether it alone would meet the requirement, or whether it was one of two courses, or was an alternate course. From this table it seems that general

TABLE XI
NATURE OF PSYCHOLOGY MEETING PREREQUISITE

	GROUPS					
	I	II	III	IV	V	Total
Number of institutions,	12	16	11	2	3	44
General psychology with little emphasis on application,	8	11	4	0	2	25
General psychology modified to meet the needs of education,	3	5	5	1	1	15
Special course in educational psychology,	6	9	5	2	2	24
Experimental psychology,	3	3	0	0	1	7

psychology with little or no emphasis on application is the course most frequently mentioned. Educational psychology is next. Educational psychology gains its place by being constantly associated with other courses. As pointed out above only 5 institutions accept this course in itself as meeting the requirement, but 4 institutions make it an alternate. While the course in general psychology modified to meet the needs of education is mentioned only 15 times, it should be recalled that it was second to general psychology as the sole course meeting the prerequisite requirement.

When it is remembered that the number of semester hours necessary to meet the prerequisite varies from 2 to 12, it is easy to see that the number of courses required must also vary. This fact no doubt is responsible for the apparent chaos which exists in meeting the prerequisite. However, out of it all one can feel safe in saying that general psychology with little or no emphasis on application is quite generally emphasized, especially in Groups I and II. This tendency is not noticed in Group III, in fact there is some indication that educational psychology is here emphasized.

The rather inconsistent use of educational psychology as a prerequisite to courses in education can be explained partly if the departmental jurisdiction of the course is set forth. Table XII shows

TABLE XII
DEPARTMENTAL JURISDICTION OF COURSES IN EDUCATIONAL PSYCHOLOGY

	GROUPS					
	I	II	III	IV	V	Total
Number of institutions,	12	16	11	2	3	44
In department of psychology,	1	5	1		1	8
In department of education,	10	4	7	2	2	25
In both departments, psychology and education,	1	7	2			10
In department of psychology and sociology,			1			1

that usually the department of education gives the course in educational psychology. This is especially true in Groups I and III. In 10 institutions courses in educational psychology are given in both the education department and the psychology department. In 8 institutions such courses are given exclusively in the psychology department. With the above facts in mind it is reasonable to expect that the position of educational psychology as a prerequisite to courses in education will vary. If it is given in the psychology department and called psychology, then it can serve as a prerequisite to courses in education, but if it is given in the department of education, then it will naturally be a part of the courses in education, and can not serve as a prerequisite. Thus the jurisdiction of the courses becomes a potent factor in the determination of the prerequisite.

III. Summary and Conclusions

From the present investigation the following facts and conclusions are evident:

1. The current practice especially in the larger institutions is for courses in education and psychology to be controlled in independent departments. The next most prevalent practice is for the courses to be under joint jurisdiction of the department of psychology and education.

2. In the large majority of the institutions the department of education itself determine its own prerequisites. In a few cases the general faculty of the college or university has some control, but such control usually consists in passing upon the recommendations of the department of education. In a few cases the instructors directly in charge of the courses are wholly or partly resonsible for the determination of the prerequisites, but as a rule the staff of the department as a body has this power. As the department of education is most vitally concerned with the prerequisites and is responsible for their administration, it seems to be a wise and just policy to allow this department the power of determining these prerequisites.

3. In almost all institutions, in fact about 39 out of 44, psychology is required for the teacher's diploma, and in a vast majority of cases is considered as a part of teacher's professional training. In 24 institutions psychology is supposed to be a pre-

requisite to all courses in education, but 20 institutions state plainly that it is not. In 15 of these 20 institutions it is a *prerequisite to particular courses only.* This last-named tendency is noted especially in the larger institutions where no doubt the departments are offering a variety of widely differentiated courses, some of which are only most remotely related to psychology. As departments of education grow and develop, more and more situations will exist similar to those existing in some of the larger institutions, and as this development takes place, dissatisfaction with a blanket system of prerequisites is sure to arise. A final solution will probably spring from a thorough analysis of the content of all courses in relation to psychology and from a determination of the prerequisites to the different courses according to their actual dependence on psychology as set forth by these analysis. This solution will recognize the value of psychology as an integral part of a teacher's training—evidenced by the fact that almost all institutions now so regard it—but will make the subject prerequisite only to those courses actually based upon it and will allow students to enter other courses without having had it, such practice now exists in 15 of the institutions reporting.

4. Even though psychology is accepted in theory as a prerequisite to courses in education in 24 of the 44 institutions reporting, each of these 24 institutions, save 9, said it would be possible for a student to take some courses in education before completing the work in psychology. These same institutions would approve taking courses in education and psychology simultaneously, and thus suggest some liberality in the interpretation of the term "prerequisite." It may be that such liberality represents the exceptional practice rather than the rule, but the fact remains that the administration of the prerequisite is flexible and not rigid. Since in the institutions under consideration the prerequisites to courses in education are usually determined by the departments of education, it can safely be assumed that attempts have been made to enforce them, and that failure to do so has resulted from the inability to administer a blanket prerequisite.

5. Additional evidence of the liberality in the enforcement of the psychology prerequisite is reflected in the treatment of those students who are not interested in the teacher's diploma or in the degree in education, but who desire to elect courses in education without having had the required psychology. Only a very small

number of these institutions would prohibit the student from electing the desired courses. Only 9 out of 33 institutions reporting would prohibit a law student, who has not had psychology from taking a course in educational sociology and only 4 institutions out of 36 would prohibit a student with a major in history who had not met the psychology requirement, from taking a course in history of education. Such practices as above mentioned seem rational and just for the relationship between psychology and certain courses, e. g. history of education and educational sociology—is not very marked, and no student will be greatly handicapped in carrying either course without psychology. Furthermore, education as a subject of study is no longer confined to the professional needs of the teacher, but has certain practical and even cultural values which are important, in the civic life of future citizens, no matter what profession or walk of life, and the simple fact of a psychology prerequisite should not hinder the pursuit of such courses.

6. Current practices in the amount and the nature of the courses satisfying the psychology prerequisite reveal chaotic and unsettled conditions. The amount of psychology required varies from 2 to 12 hours, and consequently there is a great variation in the nature of the courses which satisfy the requirement. The course most often designated as meeting the requirement wholly or in part is general psychology with little or no emphasis on application. Educational psychology is listed both as a course in psychology and as a course in education. Part of the time it meets the requirement but more often it forms only a portion of the requirement, being supplemented by various courses or combination of courses. The chaos existing in the number of hours of psychology required for meeting the prerequisite and the great variety of courses indicated as satisfactorily meeting this requirement suggests a need for definite standardization in the prerequisite. It would seem also as important to have standardization in institutions of higher learning, especially the State institutions, as it is to have standardization in the secondary schools. What greater service could the society of college teachers of education perform than to make a definite study of this problem and to formulate its findings in the form of a definite set of recommendations. Such a set of recommendations it is true could be suggestive only, but it would no doubt aid in the standardization of the prerequisite and thereby promote development in departments of education at large.

The Use of Tests in the Evaluation of Methods of Instruction

BUFORD JOHNSON

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Results of Investigations at the Johns Hopkins University Summer School.

THE fundamental purpose underlying the origination and development of educational measurements was their use for the improvement of instruction. We seem scarcely to have passed from the first stage of developing a measure that may be considered standard, and certainly have gone but a little way beyond the evalution of the status of system, class, or individual, in comparison with the obtained standard.

We believe the most effective use of measurements is in the determination of methods of instruction, meaning neither specific devices and forms of procedure, nor grouping according to intelligence ratings, but an elasticity of program that will make possible the adjustment to individual needs of drill, assignments, forms of recitation and groupings of activities.

The pupils in the five grades, 4th to 8th inclusive, of the Demonstration School of the Johns Hopkins University Summer Course for 1918 were children who had failed of promotion because of deficiency in one or more fundamental subjects. There were two exceptions—children who had not failed but wished to attend the summer session. These deficiencies were usually marked arithmetic or English, the latter including reading, spelling, composition and grammar.

From this composition we would expect the distribution curves for standardized tests in these subjects to be skewed toward the lower end.

Standard tests were given to these pupils by the students in the university course of experimental education, under direct supervision of the instructor. Records as to age and deficiencies were taken from the cards sent out by individual instructors in the various schools of the city from which the pupils were drawn. Each of the teachers of these five classes was asked during the

last week to rate her pupils in accordance with a judgment scale worked out by the Psychological Survey of New York. We will consider the records of these scores and ratings as a basis for determining methodology of instruction.

The following tests were used: The Cleveland Survey Arithmetic Tests; Woody Arithmetic Scales—Subtraction and Division, Series A; Stone Reasoning Tests; Starch Grammar Tests including only Parts of Speech, Nouns and Pronouns, Punctuation Scale and Grammatical Scale; Kansas Silent Reading Tests; Boston Copying Tests; Psychological Survey Judgment Scale.

The question of over-ageness contributes little to the causative factors. Table I shows the distribution of deficiencies according to the age and grade of the pupils. Numbers in the columns designated by curriculum subjects represent the frequency of deficiencies in those subjects. In the 7th grade there was one pupil fifteen years old and one sixteen years old, both marked "deficient" in arithmetic. In the 8th grade there was one pupil sixteen and one seventeen years old. The latter was a cripple and had an Intelligence Quotient of 80.2, determined by the Stanford Revision of the Binet-Simon Scale. The mode for each grade falls at the expected age.

Approximately, 60 per cent. of the pupils in the 4th, 6th and 8th grades; 75 per cent. of the 5th grade; and $16^2/_3$ per cent. of the 7th grade were marked as deficient in both arithmetic and English. The table comparing the central tendency of the group with tentative norms established indicates normal conditions in some subjects, especially for the 6th grade who are above in all tests taken, but slightly below in judgment rating, while in other subjects the 7th and 8th grades are below the standard in varying degrees. These are shown in Table 1A. The greatest deficiency shown is in the grammar tests. This indicates a general low standing of the class, while variations in other subjects could easily be explained by a few outstanding cases.

Tables 2 to 7 inclusive show the distribution of scores in each test. There is a marked clustering about the norms except in the grammar tests. Superficially, this would indicate the expected standing for all except a very few cases in arithmetic, reading, punctuation and simple grammatical usage. But we believe that those in the central group and above, even of the exceptionally

TABLE 1
AGE—DEFICIENCY DISTRIBUTION

Grade	Age	Arithmetic and English	English	Arithmetic	No Deficiency	Total
IV	9	1		1		2
	10	5		7		12
	11	3		4		7
	12	1		1		2
	13	3	3			6
	not given	1	1	2		4
	Total	14	4	15		33
V	10			1		1
	11	8	1	3		12
	12	5	1			6
	13	5		1		6
	14	3				3
	not given	1				1
	Total	22	2	5		29
VI	No ages given	18	2	17		37
VII	12			4		4
	13	2	3	7		12
	14	4	2	9		15
	15			5		5
	16			1		1
	Total	6	5	26		37
VIII	12		1			1
	13	1	2		1	4
	14	8	4	1		13
	15	9	3	3		15
	16	1	1		1	3
	17	1				1
	Total	20	11	4	2	37

TABLE 1 A
Comparison of Central Tendencies with Established Norms.*

	Grade VI %	*Grade VII* %	*Grade VIII* %
Woody-Division,	+13	+ 9	—10
Cleveland Survey Arithmetic,		— 8	— 8
Stone Reasoning,	+ 6	+13	— 3
Kansas Silent Reading,	+20	— 7	— 2
Parts of Speech,		—39	—40
Nouns and Pronouns,		—28	—19
Grammatical,		0	— 4
Punctuation,		0	— 4
Boston Copying,	+ 9	—21	+ 6
Judgment Rating,	— 4	+13	+34

*The figures of the table represent the per cents of the established norms by which the classes exceed or fall short of the norms.

high standing, should have an analysis of the errors made. Some erroneous habit, some lack of speed or accuracy must have been at the basis of the teacher's estimate in selecting such cases for the extra Summer Session.

TABLE 2

WOODY ARITHMETIC SCALES, SERIES A—SUBTRACTION FOR GRADES IV, V AND VI—DIVISION FOR GRADES VII AND VIII—NUMBER IN EACH GRADE THAT SOLVED THE LAST 20 PROBLEMS CORRECTLY

Grade	SUBTRACTION			DIVISION	
	IV	V	VI	VII	VIII
Example No. 16, ...	29	24	32	32	24
" " 17, ...	30	21	34	31	24
" " 18, ...	25	22	32	22	14
" " 19, ...	25	19	31	30	21
" " 20, ...	22	18	32	28	22
" " 21, ...	12	19	31	31	21
" " 22, ...	18	18	32	31	23
" " 23, ...	18	16	29	31	19
" " 24, ...	12	19	31	23	20
" " 25, ...	9	15	26	25	14
" " 26, ...	0	1	27	26	18
" " 27, ...	0	1	24	29	24
" " 28, ...	0	7	25	31	22
" " 29, ...	1	10	13	29	18
" " 30, ...	0	7	23	23	14
" " 31, ...	1	9	19	21	15
" " 32, ...	0	0	14	24	15
" " 33, ...	2	9	16	19	19
" " 34, ...	2	9	12	23	17
" " 35, ...	3	11	12	8	6
" " 36, ...	0	0	0	2	0
Median, ...	21.33	26.5	27.8	29	28.3
Class Score, ...	5.69	7.25	7.38	7.17	6.43
Standard Score, ...	4.22	5.47	6.46	6.59	7.16
Total Number Pupils, ...	34	24	35	34	27

TABLE 3

CLEVELAND SURVEY SERIES OF ARITHMETIC TESTS—COMPARISON OF MEDIAN NUMBER OF PROBLEMS SOLVED BY SEVENTH AND EIGHTH GRADES OF JOHNS HOPKINS UNIVERSITY DEMONSTRATION SCHOOL WITH THOSE FOR CLEVELAND SCHOOLS

CLEVELAND TEST	EIGHTH GRADE	CLEVELAND EIGHTH	SEVENTH GRADE	CLEVELAND SEVENTH
A	32	27.5	26	26.7
B	25	26	22	21.5
C	19	19	17	17.7
D	22	22.5	22	20.8
E	7	7.8	6	7.5
F	8	10.1	10	8.6
G	5	6.6	5	5.9
H	6	8.5	0	7.7
I	4	4.7	4	4.0
J	4	5.7	4	4.9
K	11	12.5	11	10.1
L	3	3.9	3	3.2
M	4	5.1	3	4.4
N	2	2.6	3	2
O	4	5.5	3	4.1

TABLE 4

STONE REASONING TESTS—DISTRIBUTION OF SCORES FOR SIXTH, SEVENTH AND EIGHTH GRADES

	VI	VII	VIII
Score 3.1— 4,	3		1
" 4.1— 5,	2		0
" 5.1— 6,	4	5	1
" 6.1— 7,	8	4	3
" 7.1— 8,	4	8	5
" 8.1— 9,	2	4	3
" 9.1—10,	1	3	3
" 10.1—11,	3	1	0
" 11.1—12,	1	2	2
" 12.1—13,	2	1	0
" 13.1—14,	1	2	3
" 14.1—15,	0	3	0
" 15.1—16,	1		1
" 16.1—17,			1
Total,	32	33	23
Median,	6.95	8	8.5
Score attained by Upper 80% of Class,	5.2	6.4	6.6
Standard Score,	6.5	7.5	8.75
Percentage that reached Standard,	70	70	52
Percentage of Accuracy,	77.7	78	80.7
Standard of Accuracy,	80	85	90

Under the routine adopted, even in the summer session, the necessary stimulation for the correction of the trouble will not be given. The teachers considered many quite up to standard, as the judgments show, and one remarked that she thought some of the boys just did not take interest in the regular school work, though they certainly had the ability to do it. Only by an elaboration of testing, the scheme of which is built upon the analysis of the individual performance, can the instruction be devised that makes for conservation of energy and interest.

From the standpoint of the class needs, the percentage solving correctly certain problems may be considered. Fifty-three per cent. of the seventh grade solved correctly all except the last three examples in the Woody Test, only two pupils solving the last example. The time limit enters into the evaluation of the degree of difficulty of these problems at the end. Fifty-six per cent. of the eighth grade solved 32 of the 36 problems, with no one getting the last one. The following examples are found to be troublesome for both the seventh and eighth grades:

$2 \div 2$

$\frac{5}{4} \div \frac{3}{5}$

$13\overline{)65065}$

$9\frac{5}{8} \div 3\frac{3}{4}$

$75\overline{)2250300}$

$248 \div 7$

$2400\overline{)504000}$

$25\overline{)9750}$

$12\overline{)2.76}$

$23\overline{)469}$

$\frac{3}{4} \div 5$

$3\frac{1}{2} \div 9$

Four of these and the last three examples of the test are included in the list of troublesome ones found in the Janesville, Wisconsin, Educational Survey. These examples may easily be analyzed into specific abilities necessary for automatic use of the processes and combinations. Does common usage make it more difficult to grasp the division of a number by itself? We ordinarily say, "Give the two children one each," or "There is one apiece for the five." The second and third problems listed belong to a second type, involving zeros that are often puzzling, but when the operation is mastered it is usually of permanence and effectiveness. The fourth problem lends itself to a short cut that should be easily acquired. Decimals and common fractions present difficulties widely variant according to individual needs. Certainly an analysis of these specific errors should be made and met by constructive planning.

In the Copying Tests spelling of words, omitted words and undotted "i's" were decidedly the most frequent errors; many other forms, such as capitalization and punctuation, require no more than the ordinary practice given to such. Grammar Tests show the greatest difficulty with parts of speech, nouns and pronouns.

TABLE 5
KANSAS SILENT READING TEST—DISTRIBUTION OF SCORES

SCORE	GRADE				
	IV	V	VI	VII	VIII
Scores falling between 0 and .9,					
" " " 1 " 1.9,					
" " " 2 " 2.9,	1				
" " " 3 " 3.9,	2				
" " " 4 " 4.9,					
" " " 5 " 5.9,					
" " " 6 " 6.9,	4	4	2		
" " " 7 " 8.9,	3	7	3		1
" " " 9 " 10.9,	5	4	1	6	3
" " " 11 " 12.9,	7	1	4	3	1
" " " 13 " 14.9,	4	3	5	5	3
" " " 15 " 17.9,	7	2	7	8	4
" " " 18 " 20.9,	1		2	5	12
" " " 21 " 23.9,		1	5	3	1
" " " 24 " 26.9,			4		1
" " " 27 " 29.9,			1	2	
" " " 30 " 34.9,		1	1	2	1
" " " 35 " 39.9,		1			
" " " 40 " 44.9,					
Total number of Pupils,	34	24	35	34	27
Median Score,	11.1	9.6	16.1	15.4	18.4
Standard Score,	9.9	13.7	13.4	16.5	18.8
Twenty-five Percentile,	7.0	7.3	11.5	11.8	14.5
Median Score,	11.1	9.6	16.1	15.4	18.4
Seventy-five Percentile,	13.8	13.4	22.3	20.1	20.3

TABLE 6
STARCH GRAMMAR TESTS—DISTRIBUTION OF SCORES FOR SEVENTH AND EIGHTH GRADES

Test	No. 1		No. 2			Punctuation Scale		Grammatical Scale	
	Grade		Grade			Grade		Grade	
Score	VII	VIII	VII	VIII	Score	VII	VIII	VII	VIII
0.0 — 4.9	0	0	5	2	0.0 — 0.9	1	1		
5.0 — 9.9	3	1	10	4	1.0 — 1.9	1			
10.0 — 14.9	8	4	4	8	2.0 — 2.9				
15.0 — 19.9	2	2	5	3	3.0 — 3.9				
20.0 — 24.9	5	6	3		4.0 — 4.9				
25.0 — 29.9	4	3	1	1	5.0 — 5.9				
30.0 — 34.9	3	1	1		6.0 — 6.9	1	2	1	1
35.0 — 39.9					7.0 — 7.9	5	3	7	4
40.0 — 44.9	1				8.0 — 8.9	14	4	5	5
					9.0 — 9.9	4	5	3	1
					10.0 — 10.9	2	2	6	2
					11.0 — 11.9		1	1	
Total Number of pupils,.	26	17	29	18		28	18	23	13
Median, ...	18.5	20	9	11.5		8	8	8	8
Standard Score, ...	30	33	13	16		8	8.3	8	8.2
Average, ...	19.3	19.5	11.7	11.2		7.5	7.8	8.4	8

TABLE 7
BOSTON COPYING TEST—DISTRIBUTION OF ERRORS

Errors	GRADE IV	V	VI	VII	VIII	Total No. Errors
Spelling,	70	30	46	64	20	230
Capitalization,	39	23	16	38	17	133
Omitted words,	128	78	49	72	37	364
Added Words,	9	3	3	9	3	27
Wrong Words,	17	28	25	22	22	114
Punctuation,	8	4	5	3	4	24
Undotted "i's",	41	3	72	99	80	295
Uncrossed "t's",	15	1	21	13	3	53
Misplaced Words,	*5	0	*14	0	0	19
Total Number of Errors,	332	170	251	320	186	1259

*By one pupil.

TABLE 8
TEACHER'S JUDGMENT SCALE—DEVISED BY PSYCHOLOGY SURVEY OF NEW YORK

GRADE	IV					V					VI					VII					VIII				
Score	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Section I,	7	15	9	4	0	0	9	11	0	0	0	19	13	6	3	0	10	9	6	12	0	1	6	14	11
" II,	10	8	8	7	2	0	10	10	0	0	4	25	4	6	2	2	11	14	6	4	0	0	6	16	10
" III,	11	9	8	4	3	0	7	9	4	0	0	11	23	4	3	1	4	11	18	3	0	4	4	13	11
" IV,	5	12	10	5	3	0	7	12	1	0	0	11	18	9	3	1	5	14	9	8	0	3	13	11	5
" V,	5	17	6	4	3	0	9	9	2	0	0	15	20	1	5	0	12	8	4	13	0	3	13	11	5
Total Frequencies,	28	61	41	24	11	0	42	51	7	0	4	81	78	26	16	4	42	56	43	40	0	11	42	65	42
Average Rating,	12.4					13.3					14.2					16.9					19.3				

Section I—
ABILITY TO MAKE GOOD PERSONAL IMPRESSION. The combined impression made by Facial Expression, Bearing, Speech, Voice, Personal Neatness, Cheerfulness, Courtesy.

Section II—
ABILITY TO RESPOND TO TASKS PRESENTED BY THE TEACHER. Give attention to what is being taught; Become interested in his lessons; Acquire facts; Use his knowledge.

Section III—
ABILITY TO ADAPT CONDITIONS OF SCHOOL WORK. Be punctual; Follow the program; Take responsibility; Be orderly; Do continuous work.

Section IV—
ABILITY TO FIT INTO THE SCHOOL GROUP. Hold his own; Be companionable; Stand up for school interests; Gain respect.

Section V—
PROMISE OF ACHIEVING FUTURE SUCCESS. Ability to think quickly and arrive at the correct conclusion; Initiative; Steadfastness of purpose; Ability to get along with and influence others; Determination to succeed.

All children who rank highest in the group to be judged in the characteristics listed for a section are scored 5. Lowest score 1 should include those showing marked deficiency. If the class represents an unselected group of pupils, more than three-quarters are expected to fall into the three ranks, High (4), Middle (3) and Low (2).

When we follow up the individual records, we find some who are marked deficient only in arithmetic making a satisfactory score in the standard tests in arithmetic, but showing greater deficiency in grammar tests. The seven making highest scores in grammar tests, ranking above the standard score, are all marked deficient in English. This may mean a failure in spelling or composition, in which they are not tested; but it also means that the teacher for the summer instruction did not know the real difficulties so that the situation could be adjusted for the individual's specific needs.

The scores of the individual pupils show more strikingly the wide range of abilities or difficulties. (See Table 9.) The standard norms for the respective grades in the subjects listed are taken as the basis of the computation. The percentage above or below this standard of the individual score is given in the table. The individuals are chosen to represent the extremes rather than the average. Individual A had the highest average ranking of the 7th grade; N the lowest. In each case, however, the contrasting specific disability or ability is very marked. Individual L represents the highest group of the 8th grade. His rating in the tests in which he failed to make the standard score places him not far below the norm. The scores of the 7th grade boy in the various series of the Cleveland Survey Tests (See Table 10) illustrates well the need of analysis of performances. Since this arithmetic test is of the so-called spiral formation, the various fundamental operations enter into it by intervals and with increasing complexity. The span of attention, the speed of performance and the instability in certain automatic processes can be measured more successfully,

TABLE IX

Comparison of Individual Scores with Standard.

	Individual A Best in Gr. VII %	*Individual N Poorest in Gr. VII* %	*Individual L Best in Gr. VIII* %
Woody-Division, ...	0	0	+14
Stone Reasoning, ...	0	−30	+55
Kansas Silent Reading, ...	+25		
Parts of Speech, ...	+40	−57	+18
Nouns and Pronouns, ...	+24	−54	−10
Grammatical, ...	−25	+24	−16
Punctuation, ...	0	−14	− 3
Boston Copying, ...	−25	−12	+ 7
Judgment Rating, ...	+14	−17	

thereby. In multiplication this boy never attained a high score, while in subtraction he is consistently capable. Failure in division in no sense describes his status so far as that process is considered. Why he should have failed in the simpler forms, but succeeded in the more complex forms is a problem for study. Addition offers a similar situation. Such presentations emphasize the necessity of diagnosing specific disabilities.

TABLE X

Performance of a Boy in Grade VII in the Cleveland Survey Arithmetic Tests.

		% of Norm.
A	Addition,	+36
B	Subtraction,	+36
C	Multiplication,	+ 5
D	Division,	− 7
E	Addition,	−34
F	Subtraction,	+19
G	Multiplication,	− 8
H	Fractions,	− 5
I	Division,	−14
J	Addition,	+ 5
K	Division,	+29
L	Multiplication,	−21
M	Addition,	−28
N	Division,	+ 9

An analysis of the records in comparison with standard scores suggests three groupings. One group includes those who have accomplished what is usually expected of children in such grades. This is shown by the following percentages of the pupils in the 6th, 7th and 8th grades who have attained the norms in the specified subjects.

	ARITHMETIC	GRAMMAR	READING
Grade VI, ...	59%	....	70%
Grade VII, ...	60%	41%	58%
Grade VIII, ...	44%	36%	70%

They need more varied applications to cultivate rapidity and efficient use of the fundamental operations as tools.

The second group, just below the standard score or class median, have specific difficulties, many of which a constructive program, based on the diagnosis made from the tests, could remedy, with economy of effort and time on part of pupils and teacher.

A third group have individual problems. In this class would fall 5 in arithmetic in the 6th grade; 6 in arithmetic, 11 in gram-

mar in the 7th grade: 7 in arithmetic and 7 in grammar in the 8th grade. Some of these doubtless have a much slower rate of learning. A detailed study of their needs would suggest the remedial measures.

The opportunity for instruction during a special session, independent of regular group routine, is an advance step for a system in meeting such individual failures. This should be an opportunity for remedying specific defects rather than marking time. The most significant result of the use of the tests comes from a study in detail of the facts secured, a more accurate rating of pupils, and a reconstruction in method on the basis of the facts obtained.

A Brief Group Scale of Intelligence for Use in School Surveys

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I. THE NEED FOR A BRIEF SURVEY SCALE

THE scale to be described in the present paper is the result of an effort to provide a readily-usable instrument which should make practicable two distinct, but related, types of study, in a school or school system. It was desired (1) to build a brief scale which might be used for the measurement of groups—classes, grades, schools or school systems—as regards the level and distribution of general ability among the children of these groups. Such a scale should be thus useful in making comparisons between children in different schools as regards the general intelligence of the pupils attending these schools, and as regards the grouping of the children into classes or sections on the basis of ability. Recent studies have shown marked differences between schools and school systems in this respect.[1] Results from the use of such a scale should also afford a valuable check to aid in the interpretation of findings with tests of achievement.[2]

It was also desired (2) to form a scale, which should be especially studied in its efforts to meet the demands of school principals and superintendents as regards convenience, brevity, cost and ready interpretation of results in terms of school practice, for aid in individual diagnosis. It is essential, if such tests are to be used in the schools as extensively as they should be, that the examination should be brief, that it should not involve intricacies in giving or scoring which might give a teacher trouble in the handling of the

[1]See for instance PINTNER, R. *The Mental Survey*, Appletons, 1919, or PRESSEY, S. L. *A Comparison of Two Cities and their School Systems by Means of a Group Scale of Intelligence*. Educational Administration and Supervision, Vol. V, pp. 53-62, 1919.

[2]For instance, the children in one school of a city recently surveyed averaged over a year in "mental age" below the children of another school of the same small city. It should be obvious that the same standards of achievement can hardly be set for two schools so different in "pupil material," and that distinct injustice would be done the teachers of the first school, in any educational survey of the system, if the poor native endowment of the children attending this school were not taken account of.

tests, that the blanks should be of a convenient size and easy to handle, that they should be cheap, and that the scores obtained should be readily translated into terms the average teacher can understand—into suggestions for practical action. The writer cannot but feel that insufficient attention has been given to such practical considerations in the building of certain group scales of general intelligence which have recently appeared. Sufficient accuracy for the final diagnosis of any individual case can, of course, not be expected from such a brief scale. But it should be possible, if the tests are chosen with special reference to their ability to diagnose mental defect and mental superiority, to gain a sufficiently clear indication to serve as a basis for further study—to make a preliminary selection of those individuals deserving further consideration.

2. Description of the Scale

The Scale consists of four tests, two on each side of a 9-inch by 12-inch sheet arranged as a four-page folder. Each test consists of twenty-five problems—each on one line—giving a total of 100 problems or items in all. The headings, examples and first five "lines" of each test are reproduced below. In giving the first test, the children are told that the words in each line will make a sentence,

MENTAL SURVEY SCALES Schedule E

"Cross-out" Tests

Name.....Boy or Girl?.....
Age.....Birthday .....Grade .....
Teacher .....School .....
Place.....State.....Date .....

TEST I. VERBAL INGENUITY.

Examples: (a) see a I man on.
(b) knife chair the sharp is.
(c) John broken window trees has the

(1) the cat at see. Score (1).....
(2) boy was sky the sick.
(3) bread sweep will the kitchen I. (4).....
(4 are going yesterday to-morrow we.
(5) me mine give my straw hat. Total ....

TEST II. LOGICAL JUDGMENT.

Examples: (a) dog, cow, horse, oak, cat.
(b) book, newspaper, magazine, pamphlet, photograph.
(c) base-ball, skating, checkers, tennis, dominos.

(1) coat, shoes, hat, gloves, sail.
(2) oats, wheat, barley, cotton, rye.
(3) satin, silk, fur, calico, serge.
(4) fly, ant, bee, grasshopper, mouse.
(5) bread, meat, vegetables, hay, fish.

TEST III. ARITHMETICAL INGENUITY.

Examples: (a) 2 4 6 8 9 10 12
(b) 7 6 5 1 4 3 2
(c) 1 2 4 8 16 17

(1) 1 2 3 9 4 5
(2) 2 4 6 7 8
(3) 9 8 7 6 5 2
(4) 11 10 8 6 4 2
(5) 5 7 10 15 20 25

Score (2).....
(3).....

TEST IV. MORAL JUDGMENT.

Examples: (a) Gambling, lying, drunkenness, murder, smoking
(b) begging, buying, trading, cheating, borrowing
(c) dullness, foolishness, laziness, weakness, poverty.

(1) fighting, killing, hating, quarreling, hurting.
(2) borrowing, gambling, overcharging, stealing, begging.
(3) love, hate, fondness, dislike, liking.
(4) dancing, drunkenness, flirting, over-eating, smoking.
(5) holiness, reverence, piety, obedience, wickedness.

but that there is, in each line, one word that cannot be used in the sentence; this extra word they are to cross out. The second test presents a very different type of problem; in each line four things are named, which are, in some important way, alike, and one thing which is different from these four—which does not belong with them; and the children are to cross out this incongruous element. In the third test the numbers in each line are arranged according to some rule, but there is in each line one number that breaks the rule; this number is to be crossed out. In the fourth test the problem is simply to "cross out, in each line, the thing that is worst." Five minutes are allowed for work in the first and third tests and four minutes on the second and fourth.

In deciding upon the makeup of the scale, the writer was quite as much interested in obtaining tests which might prove each of some independent value, as in forming a nicely balanced and properly proportioned examination. Test I was planned as a measure

of language ability, somewhat similar to Trabue's scales in the general nature of the abilities involved. It is, however, superior to these scales in that writing is eliminated, and scoring made thoroughly objective. Test II might better be called a test of Practical Judgment, and of information. It should be noticed that each line involves a problem of four-fold similarity and four-fold difference; the subject must make sure that the four objects he groups together are *all* alike, and that the thing he eliminates is different from *all* the other four. That is, there is here, as in the other tests, great condensation of problem. Test III, it has been hoped, might prove a test of potential arithmetical ability,—and give distinctive findings in classes where the ability of the children was good, but the teaching of arithmetic poor. Test IV is the result of an effort to express in group test form the essential problem of the Binet "definition of moral terms" test, which recent research has shown to be one of the most valuable tests of that scale.[3]

Test IV is probably quit as much a test of vocabulary as of moral discrimination; but this last element is surely involved to some extent, and, in so far as it is, it makes the test of especial interest for use in the survey of reform schools, or other delinquent groups. Each test thus has a distinctive interest of its own. The present paper deals only with the scale as a measure of "general ability." The writer hopes soon, however, to have data bearing on the worth of each test for such special purposes as have been suggested above.

Certain general features of the examination as a whole remain to be noted. (1) Certain special devices have been employed to make the directions readily understood, thus eliminating zero scores and keeping the problem of each test free from what may very well be a highly special conditioning factor—ability to understand elaborate directions.[4] In the first place, in order to avoid mechanical and over-rapid giving, and to develop the interest of the class, the directions have been arranged so that the children take part by

[3]See for instance BRIGHAM, CARL. *Two Studies in Mental Tests.* Psychological Monograph Series Whole No. 102, Vol 24, 1917, and PRESSEY, S. L. and COLE, L. W. *Are the Present Psychological Scales Reliable for the Measurement of Adults?* J. of Abnormal Psychology, February, 1919.

[4]That this has been accomplished may be seen from the fact that of a total of 176 third grade children tested in a recent survey no case made a zero score on the entire examination, and there was no more than 6% failure on any one test (the third), with 1%, 4%, and 4% on the other three tests.

answering certain questions, in the giving. This may seem superficially to add an element of looseness to the examination; but the writer is convinced, after extended trial, that if anything the opposite is true. The questions asked are invariably answered at once by a majority of the class; and they are so framed as to call forth exactly the same answer in every instance. With such an arrangement, perfunctory, half-understood giving is not possible; the rapidity with which the directions proceed is automatically regulated according to the quickness with which the children understand them. The directions for the first test are reproduced below.

> Look at the first test, example a, the first example. The words are "see a I man on." In this order the words don't make sense; but they can be made into a sentence if you leave out one word. What is the sentence?....What is the extra word?....You see "on" is crossed out, because you can't use it in the sentence.
>
> Look at example b. What sentence can you make from these words?....What is the extra word?....Cross out the word "chair" in just the way that "on" is crossed out in the first example.
>
> Look at the last example. What is the sentence?....What is the extra word?....cross out the word "trees."
>
> Now—everyone—attention! work out the other twenty-five sentences in the same way. In each list there is one *and only one* extra word. Cross it out. (Time allowed pupils, 5 min.)

In the second place, the tests have all been formulated in such a way that a very colloquial and simple statement of the problem is possible, and—what is more—in such a way that the act of the child in indicating his answer is a natural and interesting solution of the test problem. In each test the subject eliminates, by crossing out, an irrelevant or extreme element. The device is believed to be of great value—a more complete account has already appeared, to which the reader is referred for further discussion.[5]

(2) The examination is highly integrated. The directions are of the same form for each test. They call for the same sort of response—the crossing out of an irrelevant or extreme element. The arrangement of the test material is thoroughly systematized; each test has three examples, and 25 problems, placed in each instance in the same way on the page, and always one problem to each line. This carefully studied organization is again an effort to free the essential problem of the test from all irrelevant and ad-

[5] PRESSEY, L. W., *A Group Scale of Intelligence for use in the First Three Grades.* Journal of Educational Psychology, September, 1919. Also a preliminary report *Cross-out tests: with Suggestions as to a Group Scale of the Emotions,* Jr. of Applied Psychology, June, 1919.

ventitious circumstances such as peculiar form, artificial directions, special method of indicating answer, which might obscure the definiteness of the results as indicative of abilities along the lines of the functions involved in the test proper, and to make the giving and scoring as easy as possible.

(3) A special effort has been made to make the examination practical and practicable for extended work in schools, in institutions, and for "mental surveys." The intention has been that the scale should be given by teachers, investigators, or field workers, without special training in the use of mental tests, and that the blanks should be readily and accurately scored by such untrained workers. The directions are short, occupying only one side of a typewritten sheet, and are read verbatim by the examiner. The scoring is very simple and rapid; no further directions than this are necessary, that each word or number correctly crossed out counts one point, but that only one word must be crossed out in each line. It is possible, the writer has found, for student help to score the blanks at the rate of 90 an hour; the average teacher can score the entire four tests in one minute. The blanks are convenient in size and shape, and are cheap.[6] A mental survey is thus possible in a school at a minimum of expense and labor. The writer feels that the examination is especially well considered in these respects.

3. Development of the Scale, and First Norms.

The scale was developed from work previously done with a more elaborate examination already described elsewhere.[7] Careful analysis of the results obtained with this scale leads to the conclusion that the tests of which it was composed varied markedly in their capacity for differentiating degree of mental ability, and that, by proper selection of tests, a much briefer examination of approximately the same differential value might be formed. The "Cross-out" tests are the result of an effort to form such a scale.

[6]They are at present being sold at 75c per hundred, with materials.

[7]Pressey, S. L. and L. W., *A Group Point Scale for Measuring General Intelligence, with First Results from 1,100 School Children,* Jr. of Applied Physchology, Vol. 2, pp. 250-69, 1918. For details of the analysis described below, see also *The Practical Efficiency of a Group Scale of Intelligence,* same Journal, Vol. 3, pp. 68-80, 1919.

The "Cross-out" tests were formulated in the spring and summer of 1918, and were given first trial in a group of country schools in the fall of that year; the Bloomington schools were at that time closed on account of the influenza epidemic. These results served as a rough trial of methods and selection of items. Mimeographed forms were used. Preliminary forms were then printed and the scale given to all the children in the fourth, sixth and eighth grades of a small Indiana city (city "A")—a total of about 500 cases.[8] These papers were analyzed by test and by item and the tests revised on the basis of the findings. The scale was next given in all the schools of a second city (City "B"), to all the children from the fourth grade through high school—a total of 850 cases being tested.[9] These results were again analyzed in detail, and further revision decided upon, to obtain better grading, and to eliminate possible ambiguity in certain of the items. The examination was now used in a third complete survey—giving a total of 1,208 cases—of the school population of another city (City "C"); all the children from the third grade through high school were given the scale. The results from the fourth, sixth and eighth grades were once more tabulated by item, the percent passing each item at each grade converted into P. E. deviations, and the items arranged on a P. E. scale, using the sixth grade as a base. This resulted in the present final form of the scale.

MEDIANS FOR EACH TEST

Tests Grade	1	2	3	4	Cases	Tests Age	1	2	3	4	Cases
3	6.6	6.6	6.8	6.2	89	9					
4	9.1	10.9	9.6	9.5	452	10	9.4	10.8	9.7	9.7	267
5	10.8	12.3	11.1	11.3	393	11	11.6	13.2	11.3	12.1	269
6	12.6	14.4	12.9	13.3	418	12	12.7	14.0	12.5	12.8	278
7	14.8	15.8	14.5	15.2	323	13	14.7	15.2	14.0	15.1	241
8	16.4	17.4	16.9	17.3	265	14	16.4	17.3	15.3	16.4	261
9	19.8	18.7	17.4	19.5	171	15	18.4	17.9	16.7	18.4	199
10	20.6	19.4	19.2	19.5	143	16	20.8	19.4	18.8	19.5	140
11	20.8	19.9	22.0	21.0	106	17	21.4	19.5	20.9	19.5	87
12	22.5	20.1	22.1	20.3	33	18					

[8]The writer wishes to express his obligations to Superintendents E. C. Dodson, of Greencastle Indiana, E. W. Montgomery of Bedford, R. W. Tirey of Washington, E. E. Ramsey of Bloomington, and to the principals and teachers in their schools, for their unfailing kindness and cooperation. The research was carried through in a year which placed unusual burdens upon the schools. The fine cooperation which was, nevertheless, given to this work was deeply appreciated by the writer.

[9]As evidence of the ease with which the examination can be handled it may be said that all these cases were examined, by the writer himself, in one school day, and that the total cost of scoring blanks, with student help, was $5.00.

TABLE I
CROSS-OUT SCALE: DISTRIBUTION OF SCORES 5,503 CASES

Score	Grade									Age								Score
	4	5	6	7	8	9	10	11	12	9	10	11	12	13	14	15	16	
98							1	1								1		98
96						2	2	5	1				(5)	(55)	1	1	3	96
94						2	2	2	5						1		3	94
92				1	2	2	8	6	8			1		1	3	3	7	92
90					3	8	5	20	8			1	1	1	4	4	11	90
88				4	5	7	10	12	10				4	8	4	5	9	88
86				2	7	18	12	13	4			1	1	4	6	12	9	86
84			1	3	10	7	17	12	8			1	6	11	1	7	10	84
82			3	7	23	19	13	20	8			1	15	16	9	14	13	82
80			2	6	28	27	19	7	4		1	3	5	22	11	16	9	80
78			3	10	34	24	14	9	4		1	4	10	29	17	13	10	78
76		3	5	16	33	31	7.	12	5		2	8	9	25	17	14	8	76
74		1	12	20	38	23	20	7	1		2	6	18	28	11	13	11	74
72			8	26	42	20	9	7	2			12	17	26	13	9	12	72
70	1	4	27	55	63	20	5	7	1		11	20	39	34	17	18	7	70
68		8	20	41	44	26	11	4	1	1	9	12	38	35	20	10	9	68
66	1	7	32	46	78	12	6	4		1	10	26	37	38	19	12	9	66
64	3	17	45	80	46	12	4		1	3	10	43	41	40	16	8	5	64
62	3	17	52	75	55	12	7	1		4	16	36	48	54	12	12	3	62
60	7	22	66	80	33	7	4	1	1	6	27	43	50	59	12	7	6	60
58	2	37	60	83	42	1	4		1	2	21	42	69	44	13	5	1	58
56	11	46	79	83	24	5	3			16	31	60	50	47	16	6	1	56
54	16	63	87	58	39	2	1	1		15	47	55	58	46	9	4	1	54
52	24	62	83	70	28	4			1	18	50	61	40	54	10	7		52
50	41	61	77	46	17	7				31	36	43	57	37	9	6	2	50
48	43	75	76	39	15	2				23	57	43	64	35	7	2	1	48
46	50	84	81	37	7	3				29	67	62	47	41	6	4	1	46
44	61	92	53	33	2					34	56	45	51	26	6			44
42	54	86	48	24	2					45	59	45	43	31	4			42
40	73	66	35	16	1					33	47	43	41	19	2	2		40
38	83	54	31	9	3					39	50	32	40	16	5	2		38
36	77	78	16	8	1					48	64	24	23	14	3	3		36
34	81	40	19	11						44	36	27	20	13	2	2		34
32	69	36	10	4						35	34	22	17	11	3	1		32
30	57	30	11	1						33	28	30	12	8	2			30
28	44	13	5	2						21	24	10	12	4	2			28
26	48	14	5							21	26	12	10	6	1	1		26
24	29	7	2	1						17	16	9	4	1	2		1	24
22	35	6	2							12	15	11	3	5	1	2		22
20	15	4								8	15	2	2	1				20
18	13	2	1							7	7	11	1	2				18
16	11	1		1						8	4	3	6	1				16
14	6	4								1	1	4	4	2				14
12	4									2	2	3	1	1				12
10	1									1		1						10
8	3	2									3		2	1				8
6	1										2		1					6
4	3										2		2					4
2	1				*							1						2
0										(453)	(146)	(115)	(14)	(8)				0
†																		
No. Cases	971	1042	1057	998	723	303	184	151	74	1011	1035	1034	1038	960	297	226	162	No. Cases
75 P. C.	42.7	50.9	58.4	63.7	72.1	79.2	83.3	87.5	89.9	38.5	48.8	56.1	61.9	69.2	73.9	78.8	84.3	75 P. C.
Median	35.7	43.7	51.4	57.4	65.2	73.6	77.6	81.6	83.8		39.8	46.3	52.1	58.2	64.6	69.9	76.6	Median
25 P. C.	29.0	36.9	44.7	50.5	58.1	66.7	70.2	75.0	78.3			33.8	42.1	47.7	54.0	60.4	68.1	25 P. C.

* In reckoning all age norms cases below the fourth grade, and examined with the "Primer Scale," have been counted in as at the bottom of the distribution. Similarly, for ages 12 and 13, cases missed in three school systems by omission of the high school from the survey have been included as at the upper end of the distribution. For ages above 13 on cases from cities in which the high school was examined have been included. It should be added that, in tabulating for the age norms, age at last birthday was used; these norms are thus norms for 10.5, 12.5, 14.5 and not for 10.0, 12.0 or 13.0.

Attention is also called to the median ages given with the grade norms. These median ages will, it is believed, prove very convenient in comparing schools with different age-grade distributions, or examined at different times in the school year. In using these median ages a principal or superintendent should simply compute the median age at time of examination for each grade in his own school (using age at last birthday as given on the blanks) and compare with the median ages given in the norms. If, for example, a given sixth grade is found to have a median age of 12.7 instead of 12.2 then one-half of the inter-age interval, or 3 points, should be added to the norms, in order to make a fair comparison.

† Cases below fourth grade.

‡ Median age 10.12, 11.16, 12.17, 13.00, 13.92, 15.12, 16.05, 17.19, 17.56.

4. THE "RELIABILITY" AND "VALIDITY" OF THE SCALE.

In order to obtain some indication as to the "reliability" of the measures obtained with the scale, the results from the final form of the examination in the seventh grade of City "E" (86 pupils) were handled by obtaining the scores on alternate items of each test, thus forming two half scales. The scores on the half scales were then correlated and a coefficient of reliability obtained according to the formula: $r_2 = \frac{1 + \sqrt{\quad}}{2\sqrt{\quad}}$ (Brown's formula). The coefficient of reliability thus determined was .82 for the whole scale; for test I the coefficient was .81, for test II .59, for test III .75, for test IV .64.[10] "Reliability" as thus calculated indicates, of course, consistency from item to item; it is interesting to note in this connection that the reliability appears lowest on the two tests involving, to a large extent, information.

Throughout the development of the scale, the validity of the tests was frequently checked up by correlation with teachers' estimates of ability, with school standing, and with other independent criteria of ability. Data were also obtained to make certain that the tests were not unduly sensitive to such special factors as sex, social status, and so on. However, some more detailed information was desired as to the accuracy of the scale in measuring general ability, and as to the specific contribution of each test to that measure. It was evident that some reliable outside standard must be found. Since the scale was intended for use in the schools, evaluation should best be related to ability as it shows itself in school work. Correlation with marks was considered; but, as has been frequently pointed out, school grades are the composite expression

[10] A probable error was also calculated from these half scores, using the formula P. E. = $\sqrt{2}$ x .5978 A. D.

The A. D. is the average difference between score on even and on odd numbered items; the formula is simply the usual formula for the calculation of the P. E. of a test, with allowance for the fact that half tests are being worked with. The P. E. of the scale, as thus calculated, was found to be 3.65 points, or about seven months; the P. E. of test I was calculated to be 1.03 points, of test II 1.32, of test III 1.41, of test IV 1.41. The method is the suggestion of Dr. W. S. Monroe, to whom the writer wishes to express his appreciation. (See also PRESSEY L. W. *A Group Scale of Intelligence for Use in the First Three Grades: Its Reliability and Validity.* Journal of Educational Research: April, 1920.-

of a number of factors,—conscientiousness, interest, previous preparation, as well as native ability. Correlation with a composite score from a large number of other tests was also possible. But it was felt that such evaluation had little except a round- about connection with practical school problems, and would not clearly indicate the ability of the scale to deal with these problems. Besides it might very well be true that some children show a sowewhat special "test-ability" which is more or less distinct from a more sustained capacity for serious tasks; this "test-ability" would, then, serve as a constant error, which could not be eliminated by merely increasing the number of tests.[11]

The average of the ratings of four teachers upon the general ability of each child was finally settled upon as the most satisfactory outside standard. The work was done in the Junior high school of City "C," which was tested just before the final revision of the scale. The changes made following this survey were, however, slight; the present final form may be supposed slightly more accurate than the results below would indicate.

It was felt that one of the important sources of error in such teachers' estimates was the tendency to confuse effort or preparation with ability. Separate ratings were, therefore, required on the three factors of preparation, ability, and effort, to force a distinction; but only the ratings in general ability were used in the present study. The form of the rating scale was modeled directly upon the army officers' rating scale. Each child was rated by the four teachers of the four promotion subjects; the teachers had not, of course, been acquainted with the test findings. The seventh grade was finally chosen for detailed study—partly because, being the middle grade of the school, it was probably the most representative and partly because other data, which the writer hopes to use later, were more abundant for the seventh grade. Complete results were available for 116 seventh grade cases.

The correlation of the whole scale with the pooled estimates above mentioned was .64 (it might be added that the correlations for the

[11]For discussions of this problem of the independent criterion see for instance THURSTONE, L. L., *Mental Tests for College Entrance*, Jour of Educ. Psychol., Vol. 10, pp. 129-42, 1919, or RUML, BEARDSLEY, *The Reliability of Mental Tests in the Division of an Academic Group*, Psychological Monographs, Vol. 24, whole No. 105, 1917.

other two grades were .60 and .75).[12] The correlation of each test with the pooled ratings, and the intercorrelations between the tests, were as follows:

	1	2	3	4	5	
1						1—pooled ratings
2	.37					2—test I.
3	.42	.28				3—test II.
4	.44	.18	.17			4—test III.
5	.58	.41	.37	.38		5—test IV.

The method of partial correlation was used with the five variables given above. The resulting third-order coefficients, of each test with the pooled estimates, were:

r	.146	r	.250	r	.285	r	.369
12.345		13.245		14.235		15.234	

The regression equation, showing the dependence of teachers' rankings on the four tests, is as follows:

x	.1048x	.1515x	.1979x	.2218x
1	2	3	4	5

It is evident that the last two tests are the most valuable of the four and should perhaps be weighted. The fairly low intercorrelations between the tests would suggest that each test has a distinct contribution to make the score; and this suggestion is further borne out by the partial correlations. If it should be decided to use weighting, the application of the regression equation above gives a slightly more exact indication of the child's mental ability. The gain in using the weighting is, however, very slight: it raises the correlation from .64 to .67; as the scale is used in the schools, the tests are, of course, not weighted.

The scale would thus appear to be a fairly efficient measuring instrument for differentiating degrees of ability among school children, that is, for the second purpose mentioned in the first section of

[12]It is interesting to note in this connection that Ruml obtains a correlation of .66 between tests and similar rating on college students, that Thurstone obtains .61 for his scale with his Freshmen. Terman states that the correlation of Stanford Binet with estimates—presumably a single estimate on each child—is .48 (*The Measurement of Intelligence,* Houghton Mifflin Company).

the paper,—for aid in individual diagnosis—and should have a definite value for such use. How valuable it may be for the first purpose mentioned,—that of group comparisons—can only be determined after a large amount of data has been accumulated. As far as can be told at present, it would seem distinctly serviceable for such a purpose. In the surveys already made, clear-cut differences have been found between "fast" and "slow" sections, between schools, both in the ability of the children attending them and in the amount of adjustment made by the schools to the capacities of the children, and between average school children and children in institutions. The writer feels that altogether too little attention has been paid to these matters of group differences, and is making special effort to gather data bearing on the matter.

5. Summary.

1. The paper describes a brief group scale of intelligence for use in grades 4-8 inclusive. It is intended that the scale should be used (a) as a survey scale in making comparisons between sections, classes, grades, schools, or school systems, as to the level and distribution of general intelligence in these groups, and (b) as an aid in individual diagnosis.

2. The scale is made up of four tests each of twenty-five items (a total of 100 "points"). A special effort has been made to obtain condensation of matter and convenience of form:—the entire scale is printed on two sides of a 9″ by 12″ sheet; the examination can be given in twenty-five minutes, and the blanks scored in less than one minute apiece.

3. The scale in its present form is the result of three revisions, involving results from a total of about 4,000 cases. First norms, for the examination in its final form, are presented.

4. Intensive study of the results from a large Junior high school shows correlations with pooled teachers estimates of ability, averaging .66. A reliability coefficient of .82 and a P. E. of about 4 months was found.

5. A study of the findings by the method of multiple correlation shows the tests to be fairly well selected and integrated.

The Use of Psychological and Trade Tests in a Scheme for the Vocational Training of Disabled Men

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1. THE PROBLEM.

Psychological and trade tests in vocational guidance may be divided with some overlapping into two groups. Those of the first group are designed to select persons for definite sorts of work. Those of the second group are designed to select a definite kind of work for the person to be trained. The first is comparatively simple because where there is a position to be filled, the employer has only to determine the degree to which each applicant possesses the necessary qualifications for that particular kind of work. On the other hand, when the problem is to discover what sort of work a person can best be trained to do, the field springs to enormous proportions, because of the almost unlimited number of alternatives which may be considered as possibilities. This paper will deal with the second group in its relation to the vocational training of disabled men.

In the consideration of this problem certain facts should be borne in mind. First of all the man who is sick, wounded, or who has undergone severe mental shock requires special consideration. He requires guidance and encouragement of a sort which can only be given by a person who understands the difficulties under which he is laboring. In other days it was considered sufficient to keep the wounded soldier alive, ultimately returning him to society to take up life as best he could. The present aim, fortunately, is to strive by all possible means to return him physically and mentally as nearly normal as possible, and to provide training so that he may not be a burden to the community, but occupy a useful and respected place. Again it should be remembered that training in taking no thought for his own sustenance; in relying upon others for definite direction as to most of his acts; and in the subordination of self

interest has tended to rob the soldier of initiative and the controlling factors of civilian life. The result of the training in other wars has been to produce a great group of persons—political "heelers," soldier beggars, and pensioners, who, although able bodied, made no effort to work, but were satisfied to exist by the labor of others.

On the other hand, it is safe to assume that most of the soldiers, after their discharge from service will be more efficient (at least potentially) than when they entered training. This is due to the breaking down of habits by the complete change of daily routine. The recruit who found himself thrown into an entirely new environment must necessarily have met the strange conditions by a development of innate American resourcefulness which permitted him, instead of sinking, to swim and advance. When called upon suddenly to stand and deliver, with no alternative offered, his self aid becomes his source of sustaining power. Of necessity he met new conditions as they arose with quick and decisive adaptation which must certainly have resulted in self-building. We may expect that the things which in his past civil life were accepted as a matter of course, in the future will be subjected to keen critical scrutiny with the idea of betterment. Constructive criticism is the sure road to progress and attainment and to a broader outlook on life.

II. What Has Been Done.

Very little was accomplished comparatively speaking, prior to the summer of 1917. It is safe to state that prior to this time there was no scientific basis of determining a man's chance of success in any definite field. The educators who train men for life and the employer who hires them—were alike at a loss. It is true that certain experts in experimental and applied psychology had devoted months of time to the problem, and had obtained fairly accurate knowledge of what qualifications were demanded of persons entering certain occupations. However, the number of occupations in which acceptable results had been secured was less than a dozen. Comparison of this figure with that of the total of about 10,000 gainful occupations enumerated in the Occupational Index of the United States Census shows forcibly how little had been done. It should be added that the tests employed were usually unwieldy and required the presence of a trained psychologist.

Soon after the United States entered the World War, the American Psychological Association took steps to begin a work in applied psychology the far-reaching effects of which no person at the present time can estimate. There can be little doubt however, that the initial effort of this organization led to a greater increase in scientific management of men than had ever been made before in a like period of time.

Briefly reviewing this work in its relation to the problem of vocational guidance it will be noted that it was carried on along two main lines, which may be designated as group and analytic. Both are of prime importance. The group work consisted of examining recruits to determine general intelligence through the use of standard examinations. The examination consisted of a group of tests each of which was designated to test one or more mental functions. The total measured the man's general intelligence.

These tests were of two kinds and could be given to groups of from one to two hundred men. The time required for each group examination was about fifty minutes, so that one examiner and a small group of clerical helpers could examine between 500 and 1000 men a day. The results of these tests were found to be of extraordinary value in accelerating training of recruits, notably in such difficulties as:[1]

1. The discovery of men whose superior intelligence suggests their consideration for advancement, for example, to posts as non-commissioned officers.

2. The discovery of men whose low grade of intelligence renders them either a burden or a menace to the service.

3. The selection and assignment to development battalions of men who are so inferior mentally, that they are suited only for special work.

4. The prevention of undesirable difference of mental strength between different regiments or companies.

5. The early recognition of the mentally slow as contrasted with the stubborn or disobedient.

As almost two million soldiers were examined with these tests, the examination papers furnish a wealth of material for research. Assembling the scores it was found that although the distribution

[1]From Army Mental Tests.

of intelligence scores in any one trade or profession was enormous, they fell into fairly distinct groups according to the civil occupations of the recruits. Selecting at random, the group which included laborers, teamsters, tailors, and barbers averaged "C" minus; that which included policemen, boiler-makers, painters, cooks, and butchers averaged "C"; that which included bookkeepers, telegraphers, clerks, and photographers averaged "C" plus; that which included dentists, draftsmen, typists, and Y. M. C. A. secretaries averaged "B"; and that which included army chaplains and engineer officers averaged "A".

The analytic work differed from the group testing in that it had to do largely with individuals, and permitted of experiment. It required more ingenuity and frequently represented schemes which are of a most complicated and involved nature, and require elaborate apparatus. The general intelligence tests for individuals and the Army trade tests may also be classified in this group. The results of the analytic work are best illustrated in the selection of an improved and accelerated training of aviators, gun pointers and other kinds of service in which a large number of complicated facts were involved.

III. What Should Be Done.

If a disabled soldier is to be returned to society with his possibilities fully developed, it is important that the repair should start at the bedside. He should be taught to do useful things which at first require little effort, and which, if possible, should be made the beginning of a profitable occupational career. This is the beginning of vocational guidance as applied to each man, and greatest care should be exercised that the foundation is properly laid. In most instances it is best to begin the training with generalities; developing initiative, resourcefulness, industry, value of time and material—and a desire to work toward a goal. As the subject improves physically, athletic sports should be made to play a part in his rehabilitation. At no time is the question of morale of graver consideration than when the disabled soldier begins to look into the future. It is as important to teach a man to be happy in his work as it is to train him for the vocation.

Just as it was found necessary in April 1917 to devise some quick and accurate means of identifying the recruits who could

learn the duties of a soldier in the shortest time, so now it becomes essential to discover the quickest and surest method of bringing them back to a useful civil life.

Where the nature of his disability makes it possible, the man should be brought to adapt himself to the same or some other branch of his previous occupation. Some of the advantages which would result from this are that the efforts in his training would be minimized; it would tend to keep from over-crowding the other trades, and would be less liable to interfere with the rules and regulations of trade unions.

Before the vocational guidance director can go far, it is absolutely necessary that he have a definite knowledge of the fields of industry. He must have some means of estimating and knowing what is best to be done in each case. It is easy enough to say that we can select the job, and then train the man to fill it. The accomplishment is a wholly different matter. Men are not to be measured with rules, nor to be catalogued and shelved like books. Accurate placement of men can only be secured thru scientific placement. In using scientific methods of placement a step will be taken toward the solution of one—if not of the greatest—social and industrial problem.

IV. What Psychology Can Do.

There are two angles from which scientific vocational guidance must be approached:

1. What constitutes the job?
2. What are the qualifications of the men to be trained?

Job specifications should be prepared as the first step toward answering question one. This is comparatively an easy matter, and can be best accomplished by a survey of the community where it is expected the men will go after they have finished their courses of training. Such a survey would help to systematize the various occupations and at the same time show for what particular trades the disabled men could be trained to compete on nearly equal terms with their normal fellows. For such a survey it would be well to secure information from editors of trade journals, manufacturers, and trade unions. After the data has been collected outlines could be prepared somewhat after the following plan:

1. List of occupational branches of the trade under consideration.
2. Statement of what the work of each branch consists.
   (a) Amount of education necessary.
   (b) Amount of moving about necessary.
3. What would disqualify a person, as loss of limbs, loss of hearing, etc.

After the job specifications have been determined, it will be necessary to devise a series of trade tests to measure efficiency and to make sure that a man said to be skilled in any trade could really do the work demanded.

These tests may consist of verbal questions; require correct solution of trade problems; demand identification of test—tool parts, and technical drawing; and should classify a man as to his ability to do the work of a novice, apprentice, journeyman, or an expert.

Developing such tests involves the expenditure of an enormous amount of time and labor. A good start has been made in the Army Trade Tests, which measure proficiency in each of about one hundred trades. Some modification would fit these tests for use in the present need, and they have already been standardized through the successful examination of about 125,000 men.

Each test before being accepted must pass through a process of careful evolution and trial. To be of value it must rest on a scientific analysis of the processes to be tested and finally systematized and standardized.

What are the qualifications of the men to be trained?

In selecting a man for a specific sort of training it is necessary for the vocational guidance expert to make a preliminary survey of the situation to determine his future course of action. A plan similar to the following might be used:

(a) What capacity has the man to absorb training.

(b) For what sort of training is he best fitted?

(c) Of what does the course selected consist?

(d) What is his previous occupational history and what is its present value?

(e) His willingness to apply himself.

(f) Individual differences.

(a) In estimating a man's capacity to absorb training, the first thing to be determined is his general intelligence rating. This can be secured through the use of mental tests, and the results should be compared with his score made in the army. While the present scheme of mental testing is by no means perfect, verified statistics secured in the army prove it of far greater value in selecting men than were personal opinions. Another index to the subject's capacity is his educational history and vocational success.

(b) In determining what sort of training a man should have, his wishes must be consulted as a first step

If it is later found that he is unfitted for a particular vocation, the interviewer must with rare tact and fair judgment lead him to conclude that he would be better satisfied in another field.

(c) Determination of the course of training can best be arrived at by following a plan similar to that already suggested.

(d) A study of the subject's previous occupational history will shed much light on his potentialities. Trade tests should be applied to verify his statements, as well as to determine to what extent his disabilities have incapacitated him for continuance in that particular vocation. Through these tests he can be rated in that vocation, and at the same time his value in related fields of endeavor can be determined.

(e) Willingness to apply himself cannot be estimated with any mechanical scale. The keen interviewer can, perhaps, determine approximately what the subject's attitude will be toward the contemplated course of training, provided that all conditions remain normal. Like the closely allied volitional traits, honesty, tact, cheerfulness, initiative, etc., willingness is dependent upon the condition of the man's morale.

(f) Individual differences like different abilities must be carefully investigated and recognized. Just as there are no two persons identical, so not two courses of training can be expected to follow parallel lines. Each man interviewed presents new difficulties and problems, each of which must be approached in a different manner.

Conclusions.

1. The problems of training men for positions where they can accomplish most for society and attain greatest happiness is vital and should be met by persons trained in interpretation of mental processes. Skill in influencing men comes from knowledge of the mental processes and factors which determine the behavior of men.

2. Classification of individuals can be accomplished by use of intelligence tests, trade tests, and expert interviewing.

3. A man must be selected for specific lines of training in terms of what he can now do, and assigned only after an exhaustive analysis of his qualifications and of the job specifications.

4. Vocational guidance can be scientifically conducted. Psychology supplies a large part of the foundation on which the successful vocational structure must be built.

COMMUNICATIONS AND DISCUSSIONS

SOME RESULTS OF MONROE'S DIAGNOSTIC TESTS IN ARITHMETIC

At the beginning of the school year, it was decided to return to school conditions as they were before the war. With this end in view, standardized tests were given to find out the abilities of the children in the various school subjects, to diagnose the teaching situation, and to suggest remedial instruction. Until recently, examinations have been the means of finding out the results of instruction. In most examinations there are questions put that are two to three times as hard as other questions for which equal credit is given. Hence, the evaluation of the pupils' work is inaccurate. The standardized tests offer a measuring scale of samples of known quality so arranged that they are graduated as to difficulty and excellence.

In arithmetic, Monroe's Diagnostic Tests were given. Monroe's Tests were favored rather than Courtis's Standard Research Tests because the former are better for diagnostic measurement, and the latter for general measurement. In other words, the Monroe Tests are shorter, simpler, better graded, include several types of the fundamental operations, and show at a glance where the difficulties lie. There are twenty-one tests in all. Only seven were given to fifteen classes from the 4B to the 6B, inclusive. The first paper consisted of tests in the fundamental operations. The second test was reasoning. Below are the results of the tests in the fundamental operations given at the beginning of the term:

MEDIANS OF SPEED

GRADE	I	II	III	IV	V	VI
	Addition	Subtraction	Multiplication	Division	Addition	Division
6B1	14	8	6	3	7	3
6B2	16	7	6	3	8	3
6B3	16	8	7	4	9	3
6A1	13	7	6	3	8	3
6A2	12	6	5	3	6	2
6A3	13	7	5	2	6	2
5B1	11	7	5	3	7	3
5B2	10	5	5	2	6	2
5B3	9	5	4	2	5	2
5A1	10	6	5	2	6	2
5A2	5	3	4	2	5	1
5A3	8	4	4	1	5	2
4B1	6	6	3	2	5	2
4B3	7	7	3	2	5	2
4B2	7	7	3	2	5	2

MEDIANS OF ACCURACY

GRADE	I	II	III	IV	V	VI
	Addition	Subtraction	Multiplication	Division	Addition	Division
6B1	100%	75%	84%	67%	71%	67%
6B2	100	100	84	100	75	67
6B3	94	88	86	50	67	67
6A1	100	100	84	33	75	67
6A2	100	84	80	67	67	50
6A3	100	86	80	50	67	100
5B1	100	100	60	33	57	67
5B2	100	100	80	0	67	0
5B3	100	60	75	50	80	0
5A1	100	67	80	50	67	100
5A2	100	67	75	50	60	0
5A3	100	50	50	0	60	0
4B1	100	84	67	50	60	0
4B2	86	57	34	0	60	0
4B3	86	57	33	0	60	0

In interpreting the above, we find that in addition we have the best results. The poor results in subtraction, many teachers claim, are due to the Austrian method prescribed by the course of study. Other teachers claim that there is no uniformity in doing subtraction. Children coming from other schools perform the process in different ways. In multiplication, the pupils showed the need of drill in the tables. One teacher humorously said that long division was "a lost art" at the present day. The poor results in division were due to the fact that the pupils had not mastered the process of subtraction and were not sufficiently familiar with the multiplication tables.

The test in reasoning showed us that the children did fairly well in solving the principle involved, but failed in getting the correct answer. Here, again ample proof was given of weak work in the fundamental processes.

Teachers and pupils were very much interested in the results of the tests. The teachers found that the results of the measurements suggested to them economic methods in the learning and teaching process because the tests helped them to find individual differences in ability among the pupils. The results of the tests suggested changes in the grading of pupils. They pointed out to the teachers the effect of various factors in the learning and teaching process, and it was discovered that division could not be done unless the pupils could subtract and multiply. Above all, the conclusions were made the basis for securing improvement in the methods of teach-

ing and drilling when the results proved that the present method was unsatisfactory. The information derived from the tests, made the teachers consider the results and strive to improve their methods of instruction and drill according to the needs of the individual pupil. The teachers understood that the tests were for diagnostic purposes and were to show the ability and need of the pupils.

For the pupil himself the tests were a definite basis for discovering his ability; and, by keeping his own record from test to test, they furnished a powerful stimulus to the pupil to surpass his own previous attainments. The bright pupils were easily discovered and advanced. The backward pupils' difficulties were discovered and diagnosed and extra time and attention were given to them.

The tests gave new life to the schoolwork. The methods of presenting new work and drilling upon old material changed rapidly and effectively. The boys were playing a "new game" they told me. Every drill lesson was a "game" to them. They kept their own records, and a boy seemed to thoroughly enjoy competing with himself. This wave of enthusiasm continued to the end of the term. The Standardized Tests were given again and there was an improvement of one hundred percent in the fundamental operation and in the correct answers in the test in reasoning.

Below are the results of the January test in the fundamentals. The Standard Median Scores for speed and accuracy are also printed below:

MEDIANS OF SPEED

GRADE	I	II	III	IV	V	VI
	Addition	Subtraction	Multiplication	Division	Addition	Division
6B1	21	14	12	7	8	7
6B2	24	16	14	10	12	7
6B3	24	14	10	7	12	5
6A1	21	13	10	6	12	4
6A2	19	13	9	4	9	4
6A3	22	12	8	8	12	4
5B1	19	21	8	8	9	9
5B2	22	19	9	8	7	6
5B3	16	14	6	3	5	5
5A1	19	15	6	5	7	9
5A2	17	15	7	7	6	3
5A3	13	14	7	6	5	5
4B1	16	13	6	5	4	6
4B2	18	19	8	6	8	8
4B3	12	8	6	4	8	5

MEDIANS OF ACCURACY

GRADE	I	II	III	IV	V	VI
	Addition	Subtraction	Multiplication	Division	Addition	Division
6B1	95%	86%	75%	100%	100%	71%
6B2	100	75	71	60	75	71
6B3	92	79	90	57	100	80
6A1	95	77	90	67	67	75
6A2	89	77	89	50	80	75
6A3	82	91	100	88	58	75
5B1	84	71	100	100	89	56
5B2	95	84	78	63	100	50
5B3	94	93	83	67	100	60
5A1	95	93	100	60	86	44
5A2	94	73	71	57	84	67
5A3	92	71	71	67	100	100
4B1	81	77	67	60	100	50
4B2	89	74	88	84	75	75
4B3	100	88	84	75	63	60

STANDARD MEDIAN SCORES FOR SPEED

GRADE	IV	V	VI
Test I,	8.3	8.5	10.2
Test II,	4.4	5.3	7.1
Test III,	3.6	4.1	5.1
Test IV,	2.2	2.4	3.4
Test V,	4.2	4.5	5.3
Test VI,	2.4	2.8	3.5

STANDARD MEDIAN SCORES FOR ACCURACY

GRADE	IV	V	VI
Test I,	100%	100%	100%
Test II,	68%	100%	100%
Test III,	62%	67%	79%
Test IV,	49%	55%	68%
Test V,	55%	59%	63%
Test VI,	44%	57%	74%

It has been found necessary to provide a means for the pupil to master these processes by himself. The Studebacker Exercises have been ordered for the fifteen classes. It is hoped that with their aid there will be a great improvement in the fundamental process. Experiments made have shown that a class with the special drill of the Studebacker Exercises made five times as much improvement as the class with regular class work.

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EDITORIAL

A FAVORABLE indication for the progress of our civilization is the increasing interest in the subject of research. As Dr. Cattell has frequently pointed out, this country has been distinctly behind several countries in Europe in the amount of attention paid to research, in the number of men engaged in it, in the productivity of our investigators, and in the esteem in which they are held. The war has shown how vital is scientific investigation for the defense of the nation, and the National Research Council with its vigorous leaders and its considerable endowment gives promise of co-ordinating and vitalizing existing research agencies and giving rise to many others. It is true, as President Pritchett points out, much of the so-called research work is scarcely worthy of the name, but this fact only

The Development of Educational Research

emphasizes the need for more intensive effort, higher ideals of attainment, and more encouragement to productive activities.

In the field of education, as in most other fields of scientific endeavor, the universities have taken the lead, and the last decade has seen a remarkable development of interest in educational research in all the larger institutions of the country. More recently the encouragement of educational research has extended to city school systems, and perhaps twenty of the larger cities have made some provision for educational investigations. The National Association of Directors of Educational Research has already given a good account of itself through its Year Books, its published proceedings, and the enthusiastic and stimulating meetings which it has held in connection with the Department of Superintendence. A further evidence of its activity is the new *Journal of Educational Research*, the first number of which has just reached our desk. The new publication promises a greatly extended circle of influence for the Association, and bids fair to be a stimulating agency for the arousal of a still greater interest in educational research in the country-at-large. The editor-in-chief of the *Journal* is Professor B. R. Buckingham, of the University of Illinois, president of the Association during the past year. Connected with Professor Buckingham on the editorial staff are seven associate editors, each in charge of a special department, as follows: E. J. Ashbaugh, University of Iowa, secretary of the Association, in charge of the department devoted to the progress of the work of the Association; Leonard P. Ayres, Russell Sage Foundation, child accounting; W. W. Charters, Carnegie Institute of Technology, curriculum analysis and derivation; S. A. Courtis, director of educational research, Detroit, school supervision and research bureaus; Walter S. Monroe, University of Illinois, educational tests and measurements; George D. Strayer, Teachers College, Columbia University, educational finance, buildings and reports, and Lewis M. Terman, Stanford University, intelligence tests.

From this array of editorial talent there can be little doubt as to the excellence of the material that will be presented in the *Journal*. Further, as Professor Buckingham points out in his announcement, investigators in educational research have been so active during the past few years that there is at present available a greater amount of

really valuable material than can be accommodated in the established journals. The first number contains an excellent survey of the field of educational research by S. A. Courtis and P. C. Packer; a discussion of the use of intelligence tests in the grading of school children by Lewis M. Terman; a description of a true-false examination test applied to geographical material by William A. McCall; and an account of a series of calibrated objective tests in first year algebra by Murray A. Delman. We augur for the undertaking a future of great influence and usefulness. J. C. BELL.

NOTES AND NEWS

Dr. Roswell P. Angier, professor of psychology at Yale University, has been appointed to the newly-established deanship of the common freshman year.

At the meeting of the American Association for the Advancement of Science at St. Louis Professor Charles H. Judd, director of the school of education at the University of Chicago, was elected vice-president and chairman of the section of education.

Dr. Frank Ellsworth Spaulding, superintendent of schools at Cleveland, has been appointed head of the new department of education of the Yale Graduate School. Dr. Spaulding will begin his new work in September.

Dr. James Crosby Chapman, associate professor of experimental education at Western Reserve University, has been elected assistant professor of educational psychology in the graduate school of Yale University.

Miss Elsie Seyfarth, who has been giving educational and intelligence tests under the direction of the Educational Clinic of the College of the City of New York, has been appointed director of special classes for the State of Wyoming.

The proposal of the Federal Commission of Education to establish at the University of Wisconsin a research station in education has been approved by the Board of Regents. Professor V. A. C. Henman, director of the School of Education, has been designated director of the station, with Professor M. V. O'Shea and F. L. Clapp, as special collaborators.

On December 24, 1919, the trustees of the Rockefeller Foundation announced the receipt of a gift from Mr. John D. Rockefeller of fifty million dollars. In transmitting the gift Mr. Rockefeller specifically authorized the trustees to utilize both principal and income for any of the corporate purposes of the Foundation which, as stated in the charter, are "to promote the well-being of mankind throughout the world." While imposing no restriction upon the discretion of the trustees, Mr. Rockefeller in his letter of transmittal expressed special interest "in the work being done throughout the world in combatting disease and in promoting scientific research."

At the meeting of the New York Society for the Experimental Study of Education held January 16th, the general topic of discussion was "Tests of Intelligence in the Schools." The following brief papers were presented: "Mental Ability of Undernourished Children," David Mitchell; "The National Research Council's Intelligence Tests for School Children," Truman Lee Kelley; "Classification of Second-Grade Children According to Ability," Francis N. Maxfield; "The Use of the Pressey Primary Tests with First, Second and Third-Grade Children," J. Carleton Bell; "The Use of the Otis Intelligence Tests with Fifth- and Eighth-Grade Children," Stephen F. Bayne; "The Significance of Some Intelligence Tests Given to 8-B Pupils," Egbert M. Turner.

The Hamburg Psychological Laboratory, under the direction of William Stern, is publishing a series of "Studies in Mental Capacity" (Hamburger Arbeiten zur Begabungsforschung) through the firm of Johann Ambrosius Barth, Leipzig. The first three studies of the series are now ready. Number 1 is entitled "The Selection of Gifted Elementary School Pupils in Hamburg" (Die Auslese befaehigter Volksschueler in Hamburg), and the psychological report is by H. Peter and W. Stern. Number 2 includes a number of "Studies in the Intelligence of Children and Adolescents" (Untersuchungen ueber die Intelligenz der Kinder und Jugendlichen). Number 3, which has just appeared, is entitled "A Summary of Methods for Testing the Intelligence of Children and Adolescents" (Methodensammlung zur Intelligenzpruefung von Kindern und Jugendlichen) by W. Stern and O. Wiegmann, and contains a complete, systematic catalogue of all the testing methods that have thus far been published. This study will be well-nigh indispensable for teachers interested in mental testing. In addition to this series the Hamburg Laboratory is now publishing through the same firm the widely used "Psychological Observation Blanks for School

Children" (Psychologischen Beobachtungsbogen fuer Schueler). These blanks will no longer be obtainable from the Laboratory, as heretofore, but are to be ordered directly from the publishers.

The Carnegie Corporation of New York has announced its purpose to give five million dollars for the use of the National Academy of Sciences and the National Research Council. It is understood that a portion of the money will be used to erect in Washington a home of suitable architectural dignity for the two beneficiary organizations. The remainder will be placed in the hands of the Academy, which enjoys a federal charter, to be used as a permanent endowment for the National Research Council. This impressive gift is a fitting supplement to Mr. Carnegie's great contributions to science and industry. The Council is a democratic organization based upon some forty of the great scientific and engineering societies of the country, which elect delegates to its constituent divisions. It was organized in 1916 as a measure of national preparedness and its efforts during the war were mostly confined to assisting the government in the solution of pressing war-time problems involving scientific investigation. Reorganized since the war on a peace-time footing, it is now attempting to stimulate and promote scientific research in agriculture, medicine and industry, and in every field of pure science. The war afforded a convincing demonstration of the dependence of modern nations upon scientific achievement, and nothing is more certain than that the United States will ultimately fall behind in its competition with the other great peoples of the world unless there be persistent and energetic effort expended to foster scientific discovery. The American Psychological Association is one of the societies represented on the Council, and psychologists have taken a prominent part in its investigations. It is to be expected, therefore, that psychology, and particularly psychology as applied to education, business and the professions, will share liberally in the benefits of this endowment.

PUBLICATIONS RECEIVED

MICHAEL WEST. *Education: Selective, Specific, Compensatory.* New York: Longmans, Green and Co., 1917. Pp. viii, 223. $1.25.

The author, who is a member of the Indian Educational Service, gives a good picture of educational conditions in India, especially in Bengal, and makes valuable, constructive suggestions for educational improvement. The first part of the book is general in its nature, and deals with the problem of educational values. Chapter 1, Specific Education, criticises certain features of English education, particularly the effort to select by means of examinations the best boys for advancement to higher courses. Specific, or vocational, education tends to produce a stratified condition of society in which industrialism is magnified at the expense of all other aims. A compensatory education is urged in which the aim is the development of those aspects of physical and mental make-up in which the individual is deficient. This presupposes an accepted standard of the perfect individual, and the possibility of rounding out deficiencies by an educative process,—assumptions that are of questionable validity. There is frequent reference to Dewey, McDougall, Hobhouse, Bergson and Freud, but modern scientific studies in education are ignored.

WALTER NEWELL WESTON. *Intuition: Its Office, Its Laws, Its Psychology, Its Triumphs and Its Divinity.* New York: Goodyear Book Concern, 1918. Pp. 186. $1.50.

This is not a scientific book, but rather a series of anecdotes designed to establish the existence of a mysterious faculty of intuition, as contrasted with and superior to a rational reflection. The corollary is that these mystical promptings should be heeded and acted upon no matter how unreasonable they may seem. While the book is doubtless well meant, the result of such teachings is essentially vicious and destructive of all principle. In this age of the more or less unconscious obfuscation even of the intelligent it is necessary to stand firmly for the primacy of rational, clear-headed thinking, rather than throw a sop to blind emotion.

GUY MONTROSE WHIPPLE. *Experiments in the Education of Gifted Children.* Reprinted from the Michigan Schoolmasters' Club Journal, March, 1918. Pp. 16.

A stimulating and forceful discussion of the problem of the gifted child in the school. The author describes some striking cases from the literature of precocious children, and takes up one by one the questions that come before a principal or superintendent regarding the treatment of the brighter five to ten percent of the school children. While recognizing the value of special training, the author stresses the necessity of exploring the native intelligence of the child as a prerequisite for sound educational procedure. The discovery and development of special talent is most desirable, but so difficult that "the day of vocational guidance by mental tests is not so near as many would have us believe. In answer to the question whether gifted pupils should pursue the regular curriculum at a faster pace, or extend their work to secure a more intensive and a more extensive training, the author inclines to the view that many high school subjects might profitably be taken up at an early age, but it is doubtful whether the bright child should be pushed ahead into classes made up chiefly of older children. There is an interesting account of an experiment carried out with gifted children in Urbana, Illinois.

GUY MONTROSE WHIPPLE. *Classes for Gifted Children.* Bloomington, Illinois: Public School Publishing Company, 1919. Pp. 151.

This book is the outcome of a grant from the General Education Board for the investigation of the question "What mental tests are most valuable in selecting from ordinary public school classes bright pupils for training in special classes for gifted children?" The earlier chapters contain an account of the experiment as a whole, and the description of the ten individual tests, the twenty-five group tests, and the twenty educational tests used in the investigation. With the account of each test here is a brief statement of its outcome with the Special Group and with the Control Group of the investigation. Those who are interested in the evaluation of mental tests for school purposes will do well to study this discussion carefully. Chapter V deals with individual differences in the mentality of the pupils in the special group. These pupils had been selected by teachers on the basis of general impression as to school brightness, but some of them proved to be no brighter than the control group by the mental tests. One of the most striking results of the

experiment is the demonstration of the superiority of a battery of mental tests over the individual judgment of teachers in picking out those pupils who are genuinely gifted. The "ability profiles" as expressed in percentile rank in each test show the widest variation in individual attainments, as in emotional attitude and in ambition. The final criterion of the value of mental tests for classification is whether the pupils denominated bright by mental tests do conspicuous work in school and those counted dull do poor work. A detailed analysis of the school progress of the children furnishes a vindication of the claims of mental tests. In only two or three cases was there any disagreement in the outcome. On the basis of the experiment a battery of six tests is especially recommended for the selection of gifted children. These require a working time of 111 minutes, or approximately two hours. The final chapter contains an analytical study of talent in drawing. The problem was to determine what psychical traits are significant for superior skill in drawing and how may these traits be best diagnosed by tests. Owing to the great complexity of drawing ability and to the lack of previous experimental analysis the outcome of the study was largely negative, *i. e.* none of the tests could be said to furnish clear indications of drawing ability. There is a valuable annotated bibliography on talent in drawing, and a very serviceable one on gifted children.

EVA W. WHITE. *Household Arts.* Survey of the Gary Public Schools. New York: General Education Board: 1918. Pp. xix, 49. Ten cents.

This is a study of cooking and sewing in the Gary Schools. In both subjects there is an examination of the time scheduled, the staff and the instruction, and the application of various practical tests. Some of the latter were passed creditably, but on the whole there was a laxity and lack of earnestness about the work which the surveyor sharply criticizes.

J. HAROLD WILLIAMS. *Exceptional Children in the Schools of Santa Ana, California.* Whittier State School, Department of Research, Bulletin No. 6, 1918. Pp. 40.

The 1913 pupils of the Santa Ana schools were tested in height, vision, grip, intelligence (a few cases), logical memory (in two schools), opposites, spelling (Ayres scale), writing (Thorndike scale), and arithmetic (Starch reasoning). In the three school subjects the pupils tested distinctly below the norms obtained from other places.